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MAY-1922

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Why and How Rate Students in Vocational Subjects

E. E. Sheldon, Supervisor of Apprentices, The Lakeside Press, Chicago

RATING systems, efficiency marks, standings, tests of various sorts and descriptions occupy a large place in the teacher's eye today. What are these various systems all about and what are we trying to discover? What is the end in view and what is the object of all these tests and marks?

Tests as developed and used in the army had a direct object in view. There was an immediate need, and the tests as they were devised, seemed to answer the demand, at least the results were satisfactory. The trial period, however, was brief. Time alone will give a correct measure of the results attained. Following the war industrial concerns gasping for breath and grasping at straws seized upon the tests as a panacea for all their ills. Socalled employment managers trained intensively for a few weeks attempted to handle difficult industrial relations problems and to settle difficulties that men of broad training and wide experience found as serious problems. The best methods of testing have not as yet been found by industrial concerns. Years of careful study will probably bring forth a number of pretty well-developed systems of testing and grading. Teachers even looking for the best and the latest are giving the various systems of tests and ratings careful study and considerable trial.

The question at once arises, what is the object of the various tests as used in the schools, both academic and vocational? What are we trying to determine and for what purpose? Do we wish to determine who shall be permitted to attend elementary school, or high school, or college? Do we wish to determine who shall enter industry when and how? Who shall be the presidents of industrial concerns and who the porters and where the others shall fit in between?

Are we to arrange rating systems and then sit in judgment on the destinies of the unfortunates who may chance to sit at our feet in an attempt to drink in draughts of wisdom, knowledge, inspiration or what not?

Really does not one have his "nerve" right with him when he attempts to read the stars on the future of any of his fellow mortals, even though arriving at his conclusions through the most elaborate systems of tests, rating scales, or even character analyses?

There is a growing tendency among certain groups to run wild on tests and for such individuals it might be well for them to try their schemes on the dog and then attempt to swallow their own bark.

There is undoubtedly much of real value in all the systems of tests, mental, trade, psychological, or even in character analyses, but as teachers we must first determine what we wish to test for and then plan our tests accordingly. With tests as a basis and a carefully summarized outline of the school activities of the individual under surveillance, with a personal knowledge of his home environment, one familiar with conditions in the schools and in industry might be able to assist a young person to select some field of activity where he should be able to make a reasonable success with proper effort on his own part and a right attitude toward the work.

In order to measure we must adopt certain standards that can and have been reached. For each grade in all departments standards must be established and when set up as the result of a large amount of study and investigation no work should be accepted that is below the standard adopted. Such a system will establish time basis records that are easily comparable and give a truer measure of work done. When one hundred per cent means standard work in standard time and 75 per cent means standard work in a longer time, also measurable, students will begin to realize the value of time as an element in work done. Even the snail may arrive in a long period of time but one would hardly care to follow his pace from Chicago to New York today. The training values, in refusing to accept work below the established standards, is of sufficient importance in the habits formed to warrant all the time and study necessary to work out and establish such a system.

At 12:40 p. m. each day from the La Salle Street station, Chicago, there starts the Twentieth Century Limited train over the New York Central lines on its long journey of 978 miles to New York. In twenty hours, the train after a water level trip following the old trail along the lake shore, then across New York and down the Hudson arrives at the Grand Central Station,

New York, in the heart of another great city. From the heart of one great city to the heart of another day in and day out and practically always on time these wonderful trains make their way. At the same leaving hour from Chicago and from another station goes the Broadway Limited on a twenty hour schedule, taking a more southerly route of 908 miles over and through mountains also arriving through a great tunnel in the center of New York.

What has made these trains possible and what lessons can we learn from their operation in teaching young people the value of time and its application to marks and records in our industrial training courses?

A letter carried by the Century leaving at 12:40 p. m. reaches New York at 9:40 a. m. the next day, is delivered and an answer may be sent on the return train leaving at 2:45 p. m. the same day. A careless messenger misses the Century, posts the letter on the next train leaving the same station over the same route at 1:30 p. m. but arriving in New York at 4:00 p. m. the next day, too late for the business day and a whole day's delay caused entirely by a careless messenger. The lesson cannot be too thoroughly impressed upon young people that time is an important element in the business world. School life is a phase of business life and young people must be so trained that the habits formed will easily adjusts themselves to the real life that all are destined to enter, unfortunately at too early an age for many.

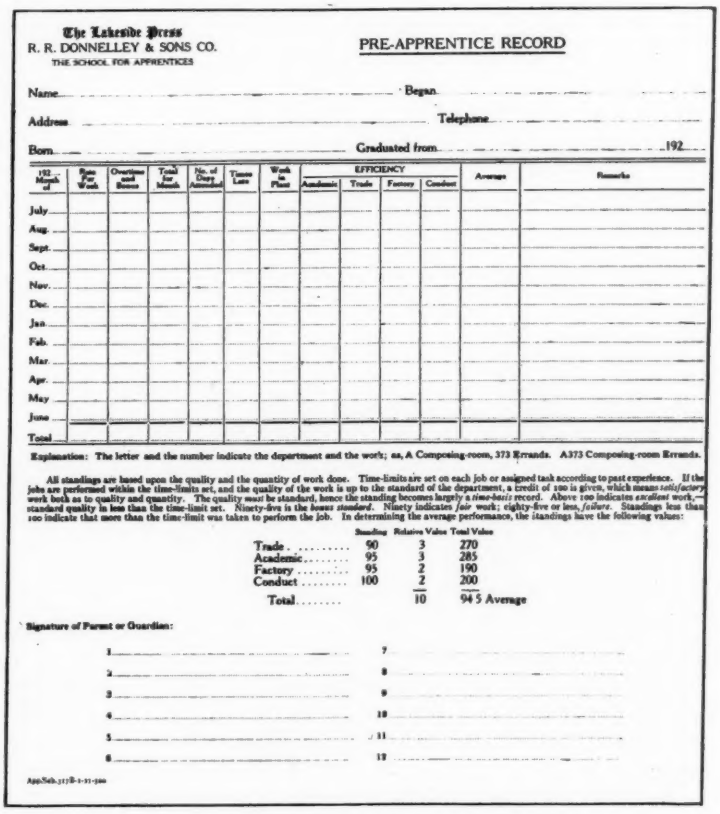
Training either in school or in life is largely a matter of habit formation and as teachers we must realize the fact and give the training that will help in forming habits that are considered essential in the business world, among the most important are promptness, accuracy, reliability. No tests will probably ever be devised that will enable one to judge with absolute certainty the exact degree of reliability that can be placed in a given individual, but tests of accuracy and of speed are possible and of much value. The various activities of the mind can be reasonably gauged and recorded and we may in time be able to have records of the school or training activities of people that will be more than estimates prepared by those unfamiliar with the activities to be undertaken by those under direction. In classes where there is supervised study the mental habits of those under supervision may be closely watched, and those students whose habits are wrong should be encouraged to speed up and meet the speed limits required to accomplish a given task in a reasonable time. Studies may be undertaken to determine what may reasonably be expected of a student within a given time and with this as a gauge a slow or careless student may often be influenced to do more and better work. The time must be a reasonable one and not the record of an unusual student. The record of the student should consist of at least two elements, reasonable speed and accuracy for age and grade.

We use the term one hundred per cent in talking about standings in school; records in factory, or the efficiency of machines or of men. What does the term mean? What is one hundred per cent?

The writer is accustomed to take a certain train, and in order to catch the train must travel a mile from the office to the depot. His schedule is twenty minutes. Eighteen minutes requires extra exertion on his part and any delay would cause him to miss the train. Twenty minutes is his schedule, and when his actual time is twenty minutes he is comfortably seated when the train starts, and he is one hundred per cent efficient on that particular job. A delay would cause him to miss the train and endure a wait of 35 minutes, thus lowering efficiency. Were he able to cut fourteen minutes off his schedule he could get an earlier train, and his efficiency would be high.

If one divides 24 cents by six cents the result is four. The question at once arises, "Four what?" And one must answer, "Four groups of six cents each."

If the division is arranged in the form of fractions, the analysis is the same; as,



The Lakeside Press
R. R. DONNELLEY & SONS CO.
THE SCHOOL FOR APPRENTICES

PRE-APPRENTICE RECORD

Name ..... Began .....
Address ..... Telephone .....
Born ..... Graduated from ..... 192..

192 Month of	Rate Per Week	Overtime and Bonus	Total for Month	No. of Days Absent	Times Late	Work in Plant	EFFICIENCY Academic	Trade	Factory	Conduct	Average	Remarks
July												
Aug.												
Sept.												
Oct.												
Nov.												
Dec.												
Jan.												
Feb.												
Mar.												
Apr.												
May												
June												
Total												

Explanation: The letter and the number indicate the department and the work; as, A Composing-room, 373 Errands. A373 Composing-room Errands.

All standings are based upon the quality and the quantity of work done. Time-limits are set on each job or assigned task according to past experience. If the jobs are performed within the time-limits set, and the quality of the work is up to the standard of the department, a credit of 100 is given, which means *satisfactory* work both as to quality and quantity. The quality *must* be standard, hence the standing becomes largely a *time-basis* record. Above 100 indicates *excellent* work,—standard quality in less than the time-limit set. Ninety-five is the *lowest standard*. Ninety indicates *fair* work; eighty-five or less, *failure*. Standings less than 100 indicate that more than the time-limit was taken to perform the job. In determining the average performance, the standings have the following values:

	Standing	Relative Value	Total Value
Trade	90	3	270
Academic	95	3	285
Factory	95	2	190
Conduct	100	2	200
Total		10	945 Average

Signature of Parent or Guardian:

1 ..... 7 .....
2 ..... 8 .....
3 ..... 9 .....
4 ..... 10 .....
5 ..... 11 .....
6 ..... 12 .....

App.Sch.3178-1-11-500

FIG. 1. FORM FOR PRE-APPRENTICE RECORD.

$$\frac{24 \text{ cents}}{6 \text{ cents}} = 4. \qquad \frac{24 \text{ cents}}{4} = 6 \text{ cents.}$$

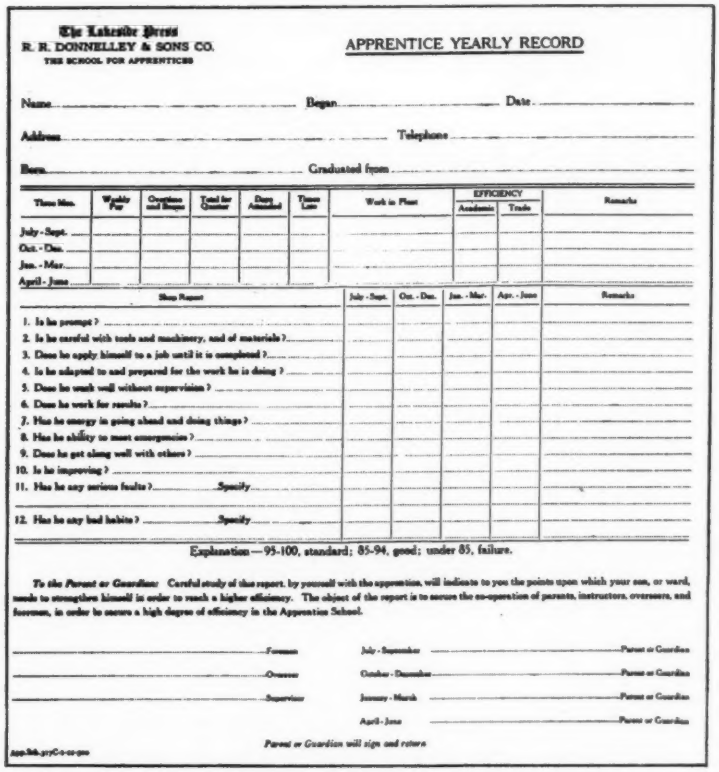
If the fractions are arranged in the form of a ratio, the same principles still apply; as, 24 cents: 6 cents = 4 ratio.

$$\frac{1}{1} \quad \frac{10}{10} \quad \frac{100}{100} = 1.00 = 100 \text{ per cent.}$$

Per cent simply means another form of ratio, or comparing of two like numbers, and expressing the results in hundredths. A given number or quantity is compared with another like number or qauntity and the result is expressed in the form of hundredths. In each case there is a comparison and in each case there are certain relations that can and do exist.

If after careful study and experiment under normal conditions and controlled surroundings and materials it is found that four hours is a reasonable time in which a man can perform a given piece of work, that time may be set as a standard time. Unconsciously we all set standard time for most of our movements in this world. The New York Central has found that "The Twentieth Century" can make the run between Chicago and New York in twenty hours. That is the standard time and everyone attempts to operate that particular train in that definite time. Its schedule calls for twenty hours, and each part of the run or operation is planned and arranged to meet the conditions imposed by the schedule. We schedule our day's work by arising at a certain time, performing certain tasks within time limits, catching a certain car, elevated train, or railway train, arriving at our work at a certain time and then sometimes we ask, "Why am I given a standard time or schedule to follow in performing my tasks?" Modern business demands definite time schedules in delivery and only by careful planning and scheduling down to minute details can the deliveries be made according to sales schedules. This demands that each individual do his share and this has led to time-studies, standard time efficiency records, and various systems of bonus payments in different organizations. These are to influence individuals to put forth their best efforts and to assist in maintaining an organization that can be relied upon to perform the allotted tasks and to make deliveries possible within the promised time, in satisfactory condition and within the estimated cost of production, for only by so doing can an organization continue to exist and flourish and give employment to anyone. We will now return to our workman, who had an estimated time of four hours in which to perform his task. Conditions being normal, he performs the job within the limits set and his actual time is four hours as against the estimated time of four hours, and we find by division that four hours (estimated time) ÷ four hours (the actual time) = 1 = the relation of the two number of hours. The whole of anything is always one hundred per cent of it, hence we say the man's rate of doing work as compared with a reasonably estimated time is one hundred per cent, or we say the man is one hundred per cent efficient. Again we may say a man is one hundred per cent efficient and knowing that the estimated time is four hours we know at once he took four hours to perform the work. As one hundred per cent of four hours is the whole of it, or four hours, under all conditions we can determine a man's efficiency as compared with a certain estimated time, if we know the actual time and the estimated time. If the actual time is five hours and the estimated time is four hours, the comparison is as follows: 4 hours (estimate) ÷ 5 hours (actual) = 4/5 = the relation between the two times (meaning the man is 4/5 as competent, or efficient, as some one else, or as is his own standard record). As 4/5 = 80/100 = 80 per cent, we say the man is 80 per cent efficient.

If we find that some one performs the task set for four hours in three hours we have: 4 hours (est.) ÷ 3 hours (actual) = 4/3 = the relation between the two times (meaning the man is 4/3 as



The Lakeside Press
R. R. DONNELLEY & SONS CO.
THE SCHOOL FOR APPRENTICES

APPRENTICE YEARLY RECORD

Name ____ Began ____ Date ____

Address ____ Telephone ____

Born ____ Graduated from ____

Three Mos.	Weekly Pay	Overtime and Bonus	Total for Quarter	Days Absented	Times Late	Work in Plant	EFFICIENCY Academic	EFFICIENCY Trade	Remarks
July - Sept.									
Oct. - Dec.									
Jan. - Mar.									
April - June									

Shop Report	July - Sept.	Oct. - Dec.	Jan. - Mar.	Apr. - June	Remarks
1. Is he prompt?					
2. Is he careful with tools and machinery, and of materials?					
3. Does he apply himself to a job until it is completed?					
4. Is he adapted to and prepared for the work he is doing?					
5. Does he work well without supervision?					
6. Does he work for results?					
7. Has he energy in going ahead and doing things?					
8. Has he ability to meet emergencies?					
9. Does he get along well with others?					
10. Is he improving?					
11. Has he any serious faults? ____ Specify ____					
12. Has he any bad habits? ____ Specify ____					

Explanation—95-100, standard; 85-94, good; under 85, failure.

To the Parent or Guardian: Careful study of the report, by yourself with the apprentice, will indicate to you the points upon which your son, or ward, needs to strengthen himself in order to reach a higher efficiency. The object of the report is to secure the co-operation of parents, instructors, overseers, and foremen, in order to secure a high degree of efficiency in the Apprentice School.

____ Foreman — July - September ____ Parent or Guardian

____ Overseer — October - December ____ Parent or Guardian

____ Supervisor — January - March ____ Parent or Guardian

April - June ____ Parent or Guardian

Parent or Guardian will sign and return

FIG. 2. REPORT AND RECORD FORM FOR APPRENTICES.

competent, or efficient, as some one else, or as is his own standard record). As

$$4/3 = \frac{400}{300} \qquad \frac{133}{100} = 133\%,$$

we say the man is 133 per cent efficient, which simply means that he can and does perform more than the standard amount set for the class of work performed. Various methods of rewards, or bonus payments, are in use to make it worth while for men to strive for high efficiency records. In some places these rewards take the form of promotions, money payments, or vacations.

In order to establish standards suitable for each grade or period of advancement, teachers should study such books as Taylor, Shop Management; Emerson, Efficiency, Twelve Principles of Scientific Management; Gilbreth, Motion Study; Industrial Management Magazine; Management Engineering Magazine, as well as the literature of education.

Commercial standards must not be set up for beginners, but reasonable standards must be set-up and gradually work toward commercial standards as a definite mark of accomplishment. One need not worry about commercializing the schools. It could not be done if we would, and would not be done if we could.

As a business proposition schools must be financed and the product evaluated in order to obtain public support. Even teachers have been known to be mercenary enough to desire salary increases. We must not despise business, unless we expect business to despise us, and then pray tell, how shall we exist for too well we know the business ability of the average member of our profession and the easy marks we often become of blue-sky salesmen.

To summarize: 1. Tests of any kind should be used only after careful consideration and having predetermined what the tests are for and what the objective is.

2. All standings should be based upon standard quality for age and advancement of students (not necessarily commercial) and be largely time-basis records.

3. Information, or reports to parents should be constructive criticism, definite and suggestive.

4. Subject matter should be given different weights depending upon values determined by careful study and analyses.

5. Reports should give definite information regarding reliability, accuracy, habits of thought and these items given as large a value as pure memory.

Pre-Apprentice Shop Report.

Name .....Address .....
Dept .....Month Ending .....192.. Work.....

1. Is he prompt?.....
2. Does he finish what he begins? .....
3. Has he energy in going ahead with work? .....
4. Does he work well without supervision? .....
5. Does he get along well with others? .....
6. Is he neat in his work? .....
7. Is he improving? .....
8. Has he any serious faults? .....
   Specify .....
9. Has he any bad habits? .....
   Specify .....

Efficiency (Shopwork) .....

Explanation—95-100, Standard; 85-94, Good; Under 85, Failure.

..... Overseer
..... Foreman
..... Supervisor
..... Parent

To the Parent or Guardian: This report is the opinion of men who are actually in charge of your son during the hours he is at work. Study it carefully.

Adam Furniture

Leslie G. Martin

Robert and James Adam were architects of the eighteenth century. Robert Adam was born in 1728 and was appointed architect to the King of England in 1762, and later was elected to Parliament. He died in 1792 and was buried in Westminster Abbey. His brother's death followed two years later.

The brothers did some notable work, including many mansions, the Adelphi and public buildings. Their work was based on late Roman and Greek classical art. They used all the classic banded and moulded ornament, rams' heads, lions' heads and claws, pendant husks and honeysuckles, swags and other forms. Some of their work might have appeared to better advantage in marble or stone.

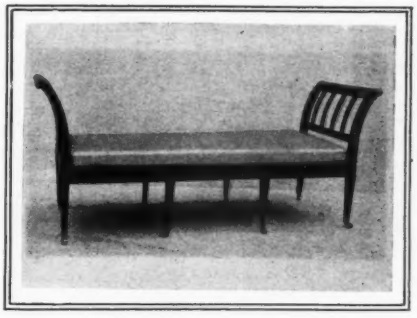
The furniture of the Adam style is of three types. The classical designs, the painted and enamelled pieces and later designs which were adapted and modified by Hepplewhite.

Adam tables were very well designed, some of an architectural character with fluted column legs and decorated capitals at the top. This type was finished with carved feet and moulded and shaped stretchers. Drawers were used very little. Gilt tables with marble tops were popular after 1760. Other small tables were semi-circular with square tapering legs finishing in the spade foot. The legs were sometimes ornamented with carved oval paterae and pendant husks. The frieze underneath the top was carved with different forms of classical ornament. Side tables of satinwood were also finished in white and gold and decorated with garlands of flowers. These beautiful tables were often very costly and elaborate. Sycamore with composition ornament and beech were also employed in constructing these side tables. The tops were somtimes of satinwood banded with mahogany and tulip wood. Mahogany side tables were ornamented with a fluted frieze and a carved ram's head at the top of the corner legs. These tables were often used between two pedestals supporting urns to form a sideboard. Some types had six legs which were fluted on three sides and the panelled frieze was decor-

ated with carved drapery swags. Composition ornament was used to a large extent on tables of this time.

Robert Adam introduced the use and manufacture of composition ornament in England after studying the process in Italy where it had a wide usage. It was similar to gesso work. The ornament could be cast in moulds and represent delicate carving. Scrolls, flowers and festoons were made over wires and were excellent imitations of carving. Robert Adam manufactured composition ornament but found it difficult to keep the process secret.

The Adam brothers designed but little upholstered



MAHOGANY WINDOW SEAT IN THE ADAM STYLE, OF A RATHER CLASSICAL DESIGN THE SEAT IS UPHOLSTERED IN SILK THE SQUARE TAPERING LEGS ARE FLUTED AND HAVE A CARVED ROSETTE AT THE TOP THE SIDE RAILS ARE ORNAMENTED WITH CARVED SCROLLS AND PEARL BEADING

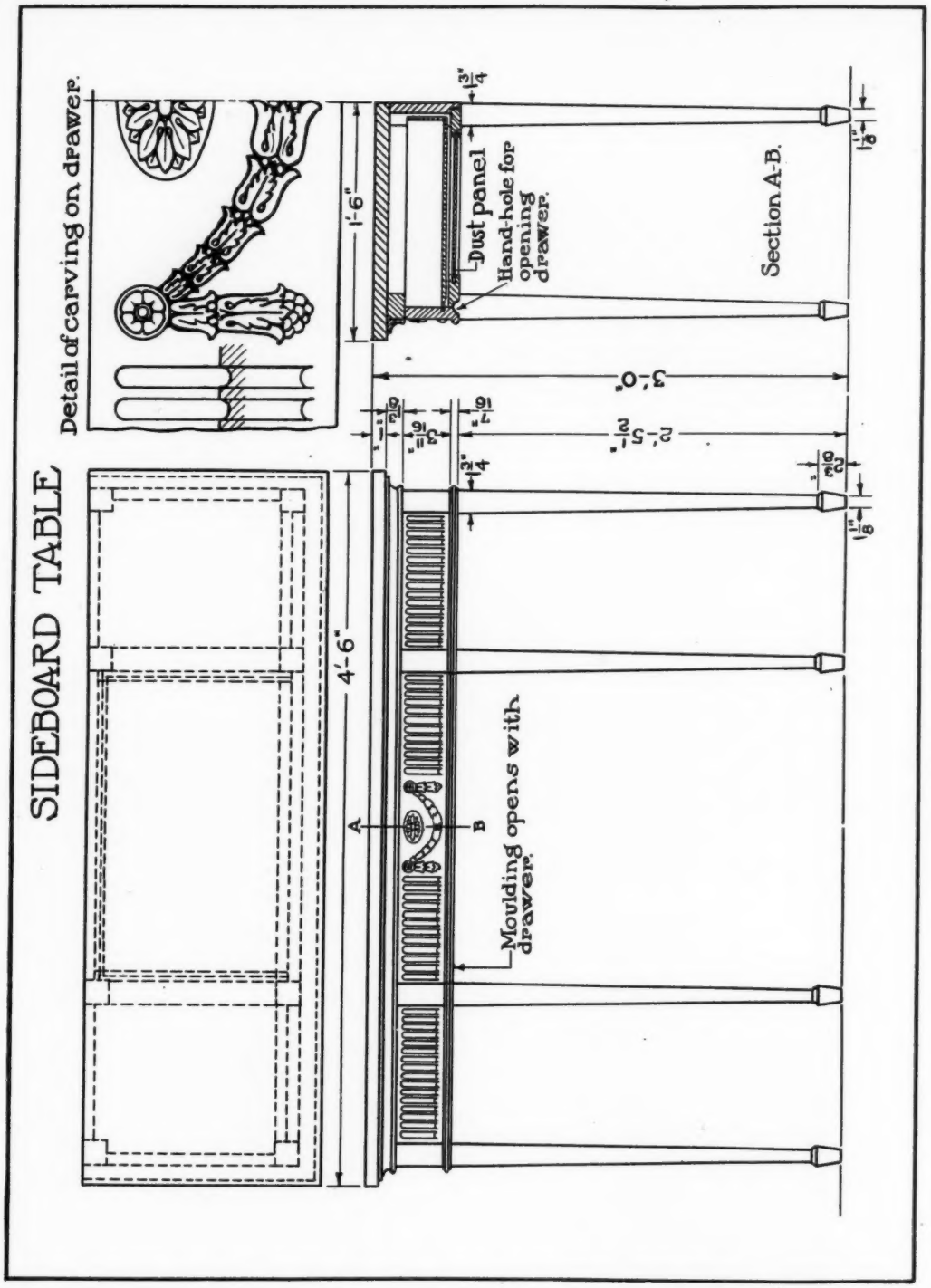
SIDEBOARD TABLE-18TH CENTURY HAS A SERPENTINE FRONT WITH FLUTED FRIEZE, HAVING A CENTRAL TABLET ENRICHED WITH CARVED SWAGS AND A MASK THE SQUARE TAPERING LEGS ARE FLUTED AND HAVE A CARVED OVAL PATERAE AT THE TOP. THEY FINISH IN A TAPERED FOOT

18TH CENTURY PINE MANTLE-ADAM STYLE THE FRIEZE HAS A CARVED DESIGN OF LEAVES AND SCROLLS THE CENTRAL TABLET IS ORNAMENTED WITH A CLASSICAL VASE FORM AND FLOWERS. THE PILASTERS ARE FLUTED STONE, MARBLE AND COMPOSITION WERE ALSO USED IN THE CONSTRUCTION OF ADAM CHIMNEY PIECES

ADAM BOOKCASE ~ HAS A DENTILLED CORNICE WITH FLUTED AND PATERAED FRIEZE. THE CENTRAL TABLET IS ORNAMENTED WITH SWAGS AND ROSETTES. THE LOWER DOORS HAVE A CARVED GUILLOCHE BORDER. THE LOWER FRIEZE IS CARVED WITH A WAVE ORNAMENT THE BOOK SECTION IS FITTED WITH ADJUSTABLE SHELVES. CONSTRUCTED OF MAHOGANY

ADAM-1770 ROUNDABOUT CHAIR WITH FLUTED RAIL AND LEGS THE BACK SPLATS ARE CARVED AND PIERCED

ADAM FURNITURE



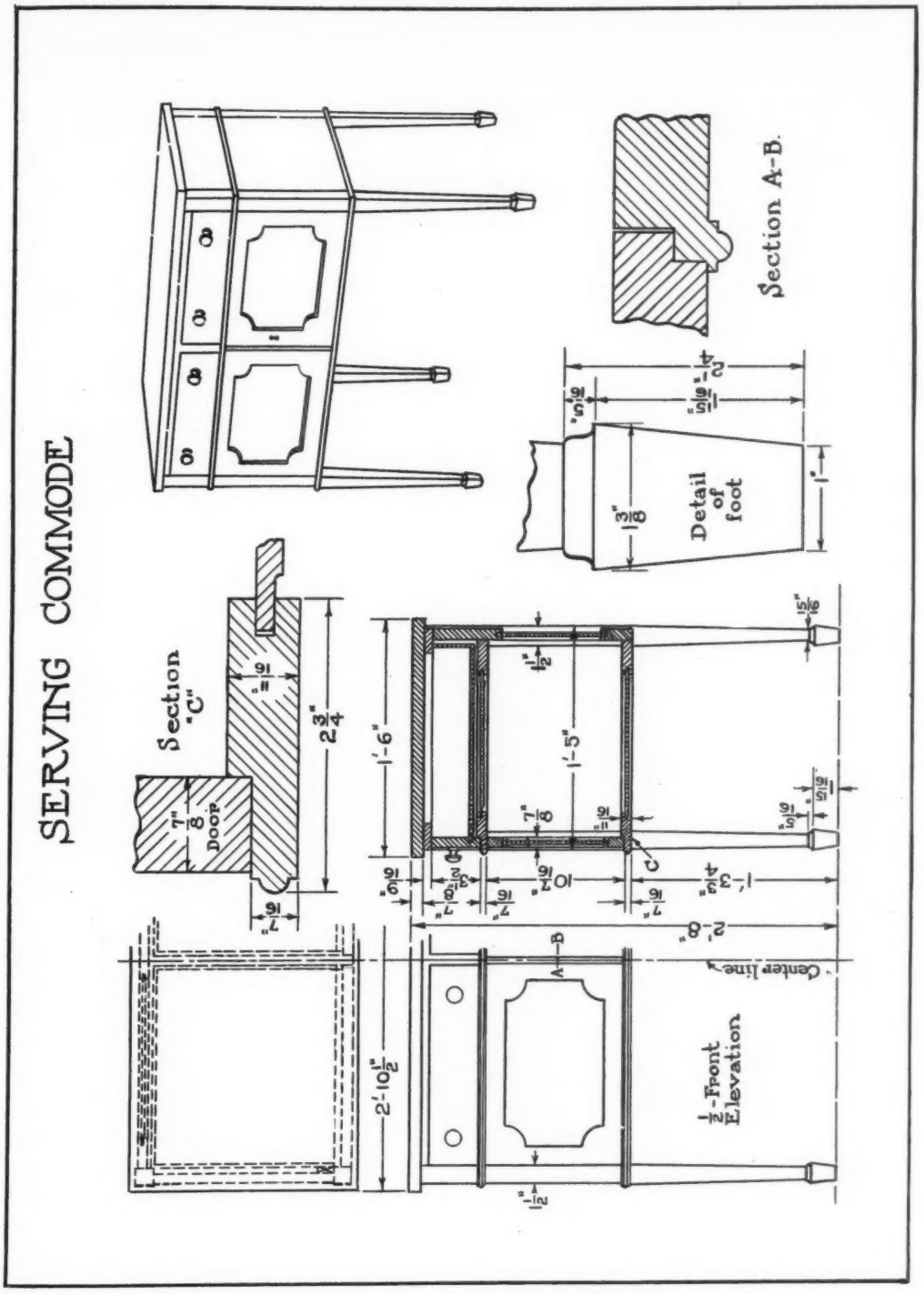
DETAILS OF A SIDEBOARD TABLE IN THE ADAM STYLE.

furniture. Window seats were one example of upholstered work. These were made with shaped ends of a classical design and had no back. The seats were covered with satin.

Robert Adam was the first designer to use the pedestal sideboard. This was composed of a table with a pedestal mounted with urns placed at each end. The table often had a brass railing at the back. The urns were made so the top could be raised and were used for holding silverware. Knife-boxes with sloping tops and rounded fronts were in use during this period.

Wine coolers or cases lined with lead for holding bottles and ice were made to slide under the sideboard tables and were usually circular in form.

Chairs of various types were in use. The wheel-



A SERVING COMMODE BASED ON THE ADAM STYLE.

back was one of the most popular. The back was composed of a number of splats radiating from a small oval in the center. Other chair backs were banded with satinwood or veneered with mahogany on pine. Leather was used extensively for seat coverings. Chairs were made with and without stretchers. Large arm chairs similar to Chippendale easy chairs were constructed and had upholstered seats and backs, and were ornamented with carving.

Robert Adam designed many types of chimney pieces of marble, stone and wood. Some were surmounted with large pier glasses.

Small mirrors of a rich appearance were constructed of mahogany or finished in gilt. These were usually circular or oval and were ornamented with composition and carving. Rectangular shapes were also

used, but mirrors were not common owing to the high cost of glass during the eighteenth century.

The Adelphi was a name used by the Adam brothers to designate a district south of the Strand which they leased and on which they erected a large number of buildings for speculation. It was a failure and in 1773 through an Act of Parliament the Adams submitted the whole property to public lottery.

The Adam style gradually merged into that of Hepplewhite and there are many pieces which show characteristics of both styles such as bookcases, desks, chests of drawers and cupboards.

In 1773 the Adam brothers published a book called "Works in Architecture of Robert and James Adam, Esquires." This contained many designs of interiors and exteriors of buildings, decoration and furniture.

Vocational Guidance in Rural Communities

D. Ralph Hostetter, Graduate School of Education, Harvard University

In a recent conversation with a friend on the question of vocational guidance our discussion drifted to the rural schools. It was quite natural that we should discuss that phase of the work, since both of us are from the country and have a fair knowledge of rural conditions.

In the first place my friend thought vocational guidance was not needed in the rural districts where farming was the chief occupation. By tradition, farmers' sons will become farmers. They can learn farming from their fathers.

I tried to tell him that farming today must be carried on on a scientific and business basis. Farming by imitation will prove a failure. Today the farmer must know which field needs lime; why some crops require more nitrogen than others; he must know the various ingredients of fertilizers, be able to read the analysis and be certain he is getting what he thinks he is buying; he should be able to judge his soil and perhaps mix his own fertilizers; he must be wide awake to the demands of the markets and grow fruits and vegetables that are in demand. Perhaps he should make a specialty of something as a side line. Proper accounts must be kept, there must be no "boarders", but all producers on the farm. The father has learned the occupation from his father. Shall the boy copy his father's methods and farm in a hit-or-miss fashion? Or shall he have education in this occupation and adopt modern methods and principles and make farming a business? What schools in the rural districts give this kind of training? I asked. None but the vocational schools. But the vocational schools which are established in the rural districts are largely agricultural, there is no provision made for the farmer's son who wishes to become a banker or an electrician.

I tried to explain the ideal school with its various workshops and try-out schemes. If there was a son who did not like to farm, he would have a chance to try his skill and abilities at various trades, and under the supervision and guidance of teachers could discover for himself in what direction his interests and abilities centered. If by playing with tools and getting a taste of this and a taste of that he could finally come to realize that he would make a better carpenter than either a farmer or banker, it would be an injustice to compel that boy to stay on the farm and perhaps make a failure in life.

The same is true of schools located in the towns. The sons of bakers or grocers may be better farmers than they would be bakers or grocers. This vocational school would give them a chance, at least, to find out.

In connection with the various try-out courses, there should be a life-career class. This class would study the various occupations, not for the purpose of choosing one, but for the purpose of broadening one's outlook, laying the foundation for a wise choice later on. A survey of the occupational world, including occupational problems and opportunities would be studied. If the boys are taking a try-out course in gardening, the life-career class should study agriculture, its importance; its relation to the community, to commerce, and to other industries. It should study the farmer, his work, his problems, his relation to the merchant and to the markets, etc.

The best method for studying an occupation is to visit the farm, shop or factory; talk to the workers and watch them do their work. These visits should be supplemented by books and magazine articles, reports, and class discussion.

My friend agreed, but said it would take more money to fit up such a school than the community would give. I said I didn't think it would. Nothing need be very elaborate to start in, much can be done with crude material. If the purpose and plan of the school were laid before the community, and a request made that the school be given a trial, I am sure some money would be forthcoming. After the start is made and the people see the results, and even though it does cost more, they will give the school authorities liberty to go ahead and raise the taxes. The people are dissatisfied with the product of our secondary schools—too much restriction to Latin, Algebra, ancient history, etc., and not enough of education whereby they can earn a livelihood as well as prepare for college. If by adding a little more to the tax, the school is able to turn out a wage earner or at least a prospective wage earner, I think the money question will be settled.

In many cases there will be no immediate need for money. In fact, perhaps, it would be wiser to wait un-

til results are obtained before asking for it. Results are concrete, and the community can see for what its money is being spent. A person will part with a tool before a dollar bill, and why not have several boys canvass the neighborhood for tools? Many a farmer has an extra hammer, hatchet, saw, chisel, screw driver, nails, wire, etc., which he would willingly give. These tools could become a part of the school property, or be returned to the owners at the close of the school term. In many rural districts spelling bees and package sales are held every year. Ten dollars realized from an affair of this kind will buy the tools and supplies necessary to make a beginning.

He asked, if such a school is established, are there not too few children to make it successful? I told him if there were not enough children in any one locality, one school could be built to accommodate several districts. These children of junior-high-school age could easily be transported to the school. This would solve that problem. He was uncertain whether this kind of education would not tend to take the boys off the farms, and farm labor is so scarce already. I tried to show him that it would be well in some cases if the boy did leave the farm, but that in a majority of cases the boys would wish to remain on the farm and even would induce others to come to the farms. Many boys leave the farm because they hear of the wonderful wages paid in the cities, of the easy work in the factories and the short days, and the spending money in the pockets of boys who work there. They seem to see only the bright side of town work and the dark side of the farm. Give him a taste of town labor in its various forms, mill, shop, and factory, and also a taste of real scientific farming, and I am sure he will be satisfied to remain a farmer. It will not drive him to the town, but will arouse in him a new interest in agriculture.

There are other boys, not born on the farm, who would make splendid farmers, if given a chance to express themselves and prove it. Here is their opportunity. Farm life has many attractions today, and if the real facts about the science of agriculture are presented in the right way, I am sure many young men with ambition would turn to the farm rather than to the town.

He wanted to know how much time the boys spend in trying out the various courses, whether they aren't wasting their time, and suggested that probably when they are through school they will be so full of notions that they will not know what to do. I tried to change his view about wasting time. The broad experience gained in the various workshops and courses will be an excellent foundation on which to build a life career. A boy should spend sufficient time in these try-out courses to enable him to have a general idea of the work in that particular course, the nature of that work, the demands for those products, the demand for workers in that field, the advantages and disadvantages of that work, the relation of that work to the other occupations, the effects of the work on the moral, ethical, and physical life of the worker, etc. After he has gone through all these try-outs under the supervision of counselors, he will have a fair understanding of all or a large number of the common occupations, and will have a greater interest in some than in others, and after he has made a choice, will appreciate and be more satisfied with his work than he would be if he had made a choice without knowing some of the trials and hard places in other occupations. The cause of much of the labor unrest and general dissatisfaction in the occupational world, is due to the lack of understanding and appreciation of the other man's job.

Even if the boy should "waste his time" in the try-out courses, it is much better to waste his time in the school in trying out the various trades and under the guidance of expert advisers than to waste his time jumping from job to job in the occupational world without any guidance.

I do not think there would be any trouble about the boy being full of notions. It will not hurt him to be full of notions, he will in time if given the right kind of experience, narrow himself to a choice among a few occupations. The vocational guide must be on the alert and watch these indifferent boys.

He said such schools will turn out boys who are "Jack of all trades and master of none." As I had told him before, a knowledge or smattering of several trades is a very good thing. In the first place, his vision of the occupational world is so much larger, he sees more than his narrow field of activity, he can understand the other fellow's problems. Secondly, a person who is skilled in only one trade is in rather bad circumstances. In this age of versatility a man should not only be a good farmer, but should know something of other vocations as well. Times may come when the farmer or farm laborer has no work, then he could easily turn his efforts to carpentry or some other second choice, instead of becoming a member of that large group of unemployed and consequently a trouble maker. Yes, better be Jack of several trades.

He expressed a fear that if the farm boys and others as well have a trial in the "soft" or "white collar" snaps, few will want to do the "dirty" or hard work.

I said the vocational counselors know of no such thing as dirty work. All work is honorable and must be respected. The humble street cleaner should command as much respect as the prominent lawyer. Special efforts and perhaps special inducements will have to be used to enable some to see the great and important work done by the street cleaner. Society would suffer much more from the lack of street cleaners than from the lack of lawyers. The word "dirty" is unfortunate and should be banned from the vocabulary of the vocational guides.

As far as "soft" or "white collar" snaps are concerned, that depends entirely upon the individual. It is true that in some occupations it is easier to wear white collars than in others. For instance, contrast the high school principal and the blacksmith. There are many

advantages in working without white collars, these trades are in the majority, and often the most pleasant ones. A trench digger's job is "soft" if he does not dig. A loafer's job is soft. A lawyer's job is a strenuous one. A business man's job is a nerve wrecking one. No job is soft if the individual goes into that job with the idea of working. If he loafs, every job is soft.

Several other questions were discussed, as for instance, whether the children could be kept in school long enough, since the parents need them on the farm and would keep them at home.

I discussed the compulsory attendance law, the cooperation of parents with school authorities, and the continuation school. The attendance law would keep the children in the junior high school until they had a fair knowledge of the occupations. After that moral suasion would be resorted to. If compelled to work, the school would release them for a part of the time, that is allow them to work and study at the same time. This arrangement would continue as long as possible, probably to the eighteenth year. Then the school would release its hold.

In a well developed school system the vocational counselors and various employers could work together, whereby arrangements would be made with some employer for the boy. This part-time work can be done in two ways. Either the boy may secure work in a trade he wishes to follow later on, or secure work in any trade in order to get money to continue his schooling. In the first case he would study his trade in school in connection with his actual work.

My friend finally admitted that the whole thing looked good and he was willing to help bring about the desired change.

The Selection and Use of Lettering Pens*

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Ohio State University

THE ABILITY to do good lettering is not only desirable but is coming to be recognized as necessary for those engaged in technical, commercial and industrial work. There are no "easy" or quick ways of learning to letter. The forms of the various letters and their relative proportions are learned by careful practice and observation. A knowledge of some of the pens which are available and some ideas on their possibilities may help one to avoid laborious or awkward methods of attaining results.

The ink used must be such as will give black lines no matter how fine they may be. Drawing ink is most used. Ordinary writing ink will corrode pens in a very short time. To insure uniformly good lines, the pens should receive proper care. A new pen is sometimes rather stiff. The points may not make good contact with the paper. Stiffness can be overcome by "working" the pen, that is using it to make a number of lines and practice characters. Another method is to heat the pen in match flame. Poor contact may be due to the pen point or to the position in which it is held. Working

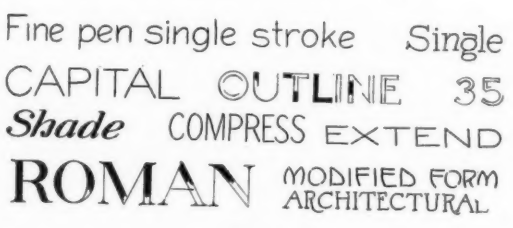

FIG. 2.

the pen on a piece of paper will help, until considerable use has given it the right "feel." Once a pen is well "broken in" it should be kept for one person's use, as no two people hold or handle a pen in exactly the same manner. A smooth-working pen is often ruined by allowing another person to use it.

A pen should be thoroughly cleaned of all ink after using. Alcohol will be found very good for this purpose. Ink will often dry in a pen while it is in use. Sometimes this is the cause of rough lines or uneven flow of ink due to small dried particles working down

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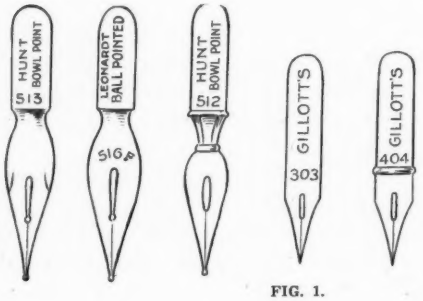


FIG. 1.

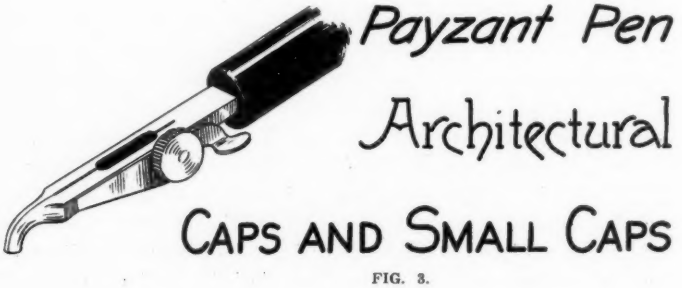


FIG. 3.

to the point. Cleaning is the way to overcome this difficulty. Too much ink or too little ink are further sources of trouble. For common pens, place the ink by means of the quill filler, or dip the pen, then shake the surplus ink back into the bottle. This will leave the right amount of ink on the pen for ordinary use.

Several common lettering pens are illustrated in Fig. 1. For fine lines, Gillott's pens, numbers 170, 290 and 303 give good results. They are used for small single stroke letters, for shaded letters, built up letters, and for fine terminals. Some of these uses are suggested in Fig. 2. Gillott's 404 pen is a very satisfactory general purpose pen for most purposes where small size letters are to be made. It is sufficiently firm to allow ease in handling and does not "catch" in the paper easily. For a coarser line and larger letters, Hunt's 512 pen will give a smooth line. Still coarser lines may be made with Leonardt's ball pointed pens. These are good practice pens for the beginner as well as for regular use.

There are a number of ways of making "'heavy stroke" or wide stem letters. The pens previously described may be used to outline and fill in the letters, or to build them up. Such letters can be formed more quickly by means of a brush or by specially designed pens such as the "Payzant," "Perfection," "Spoonbill," etc.

FIG. 4.

The Payzant lettering pen, Fig 3, is made in nine graded sizes. It gives a uniform width of line and is easily handled. A quill or "'dropper" is used for filling the reservoir. The knurled screw is used to adjust the nibs for the proper flow of ink. Some letters made with the Payzant pen are shown in the illustration. The ends of the strokes are "round" but may be "squared up" with an ordinary fine pen.

The Perfection pen is illustrated in Fig. 4. It consists of a cone shaped reservoir for ink with a tube and plunger extending to the paper. This pen works equally well in all directions and its use is quickly mastered. Some idea of its possibilities are indicated in the illustration. Note the modified Old Roman which is made by first lining in single stroke, then making the wide strokes by a second line, and finally adding the terminals.

FIG. 6.

The Speedball pen is made in five sizes, with either round or square points and is shown in Fig. 5. A large variety of letters can be easily and quickly made with these pens. They are held in an ordinary pen holder and have much the same "feel" as ordinary lettering pens. Some letters and positions of the pen are illustrated. The square pen shown at II may be turned over as at III and used for making shaded letters, or for Old English and other styles ordinarily made with some form of broad stroke pen.

The Spoonbill pen, Fig. 6 is made in several sizes and can be used for making wide stem letters quickly. The three stages in the formation of the letter, "E", illustrate a method of making letters having different widths of lines.

For shaded letters, round writing, Old English, etc., Hunt's No. 400 line pens are used, Fig. 7. These are made in eleven sizes so that any desired width of stroke can be obtained. Such pens give a broad stroke in one direction and a fine line at right angles.

The ruling pen is used by some draftsmen with good results. Lettering made with a ruling pen is shown in Fig. 8. Considerable practice will be found necessary. The pens previously mentioned are to be preferred.

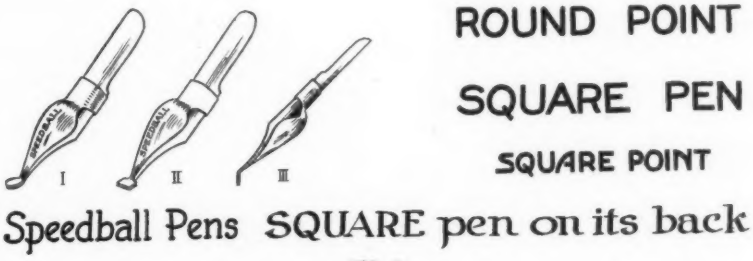


FIG. 5.

Heavy stroke letters can be made by using an orange wood or box wood stick sharpened as in Fig. 9.

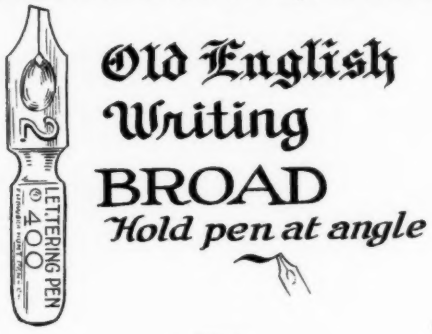


FIG. 7.

A soft wood stick with wedge shaped end may be used where special widths of letters are desired. The stick is dipped into the ink. Care must be taken to obtain lines of uniform blackness. The method of using is similar to that required for a short flat brush.

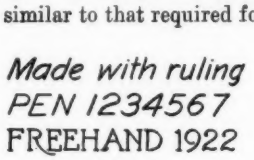


FIG. 8.

FIG. 9.

This article is not intended to illustrate all kinds of lettering pens nor even to exhaust the possibilities of those which are shown. It will, however, offer suggestions to those who do lettering either through interest or necessity. The applications shown may be extended in many ways to suit individual requirements.

Planning Industrial Work

Lucius Y. Conahey, New York City

THIS analysis and proposed courses of instruction, are designed to aid the new and the up-to-date teacher of industrial work to plan his work. They were used by the writer in laying out his work for the school year 1920-21.

Industrial-arts work "represents the changes made by man in the raw products of nature to make them more usable as food, clothing, shelter, utensils, tools and machines, and records of his experiences, as books and periodicals."[1]

Upon entering a community the instructor in industrial work should make an industrial survey of the community and the people with whom he must deal. He can use his junior-high-school boys in compiling these statistics as regards the number and kinds of industries in the community. This might be a part of the course. Then with these statistics and other statistics obtainable from the superintendent of schools, the instructor can compile an analysis or survey as detailed and helpful as if a very expensive survey had been made. It is a case of figuring out in black and white what a survey would show. It doesn't take an instructor long to diagnose his community, just as he can figure out what students in his classes are going to pass his examinations before it is given. This analysis is adapted to any community.

There would be no educational objection to these courses being offered in any community. The most popular aim and objective of industrial work "may be stated as including values for increased practical efficiency and more intelligent citizenship; trying out of vocational guidance values; and values in concrete experience giving motive for and interest in the subjects related to wider vocational and social interests. * * * To these may be added the specific training values for those who will enter industrial vocations * * * Here, as in the elementary school, industrial intelligence, insight and appreciation constitute the largest values, and these should not be subordinated to the mere manipulation of tools." [2]

However, such work as home gardening, harness making, etc., would be impracticable in many communities. Then, too, some industrial work of some of the most important industries of the community should be included in the industrial work of the school that the students may obtain an insight into the industries to which many of them are destined.

In communities up to 10,000 to 15,000 population, all the phases of the industrial activities taught, should be carried on in shop. In one large shop classes must be smaller ranging from twelve to eighteen in each class. In larger communities and in communities where there is a demand for a single phase of industrial work separate shops seem to be most feasible. In shops for single phases of the work, classes of sixteen to twenty-four pupils can be more readily accommodated. (At least such are the deductions of the writer.)

Another and far more vocational form of industrial work that can be put over by a wide-awake instructor who knows his community, is that of having his older boys actually work in the industries while attending school. This work would be feasible for some, but not all boys. For instance, instead of the boys enrolled for the course in printing attending classes in printing, say from 9—10:30 a. m. at school, they could report at some printing office in the community from say

[1]Elementary School Curriculum, Dr. F. G. Bonser.

[2]Industrial Education in Present School Problems, by F. G. Bonser, in School and Society, Vol. 4, 1916, page 318. Some in "Proceedings," Eastern Arts Association, 1916.

8:30 to 10:15. Perhaps one or two could report at that time; two others could report from 10:15 a. m. to 12 m., and so on throughout the day as their programs would allow and the printer's needs and accommodations would permit. The instructor could furnish the printer an outline of the work he desired the student-apprentices to complete and attempt to guide the printer to see that the public covered the requisite work. This scheme must be slowly, carefully and cooperatively worked out. It can likewise be utilized in other industries.

The writer has found it an unusually good policy to organize a troop of scouts in his community. In this way, he causes the community to realize he is doing something other than that for which he is paid and at the same time, he will find scouts from his troop in practically every class. Upon these scouts he can put absolute dependence. Practically without exception a scout is just as trustworthy as is the instructor and perhaps more conscientious. The instructor can insist that the scouts attain merit badges in one or more forms of industrial work, such as carpentry, electricity, and other craft work. Such projects described in the "handbooks" on scouting, are goals attainable as well, by non-scouts. Even though each class cannot be made a chartered troop, and it is inadvisable to form troops larger than 24 to 32, the scouts in each class as well as the others who are most dependable, may act as patrol leaders—looking after the extra tools, stains, varnishes, etc.

In the course in benchwork in wood, an unusually good plan to follow is to have each class make a mechanical drawing of one project each month. Having the new project before the class, the instructor makes the drawing on the blackboard three times (sometimes but twice) as large as the pupils make it. For instance if the students draw a border line one-half inch from the edge of the paper, the instructor makes it 1½ inch from the edge of the board. Then if within their paper, it measures 8 inches by 11 inches, within the border on the instructor's board, there is a measurement of 24 inches by 33 inches. Then if they draw a line 1 inch below the upper border line, he makes that line 3 inches below his upper border. And so on. In this way unusually satisfactory results are obtained and students see what they have drawn and understand it better than if each drawing was made individually. Whether or not a student has finished his previous project he is required to make the drawing of the new project for two reasons: First, that he may learn to make a working drawing and second, that he may not annoy the others while they are drawing. When special projects are made other than the regular projects, a working drawing or at least a freehand sketch should be made individually, with the assistance and cooperation of the instructor. The writer is jealously proud of this method of making class drawings as the method has proved enormously satisfactory.

A COURSE IN PRACTICAL ARTS FOR JUNIOR HIGH SCHOOL (GRADES 7 & 8).

I. Case Group.

Boys, 12 to 16 years of age, inclusive.

A. Rural and urban.
   1. 50 per cent rural.
   2. 50 per cent urban.

B. Probable age of leaving school, 16 years.
   1. 20 per cent urbans, have left at age of 15 years.
   2. 22½ per cent urbans, leave at age of 16 years.
   3. 22½ per cent rurals, have left at age of 14 years.
   4. 23 per cent rurals, leave at age of 16 years.
   5. 7 per cent rurals and urbans finish high school.

C. Probable general vocations.
   1. 50 per cent farmers.
   2. 25 per cent clerks, bookkeepers, salesmen, etc.
   3. 10 per cent garage helpers, machinists, carpenters, printers, and manually skilled workers.
   4. 5 per cent professional men, lawyers, doctors, preachers, teachers, etc.
   5. 5 per cent business managers, such as owners of garages, newspapers, banks, stores, etc.
   6. 5 per cent unskilled, non-specialized workers and miscellaneous.

D. Home environment.
   1. 95 per cent good American homes.
      a. 50 per cent living on farms (general farming.)
      b. 50 per cent living in town or just on the outskirts, most having room for small garden.
   2. 5 per cent in poor homes of ignorant parents, hard-working, usually of foreign descent.

E. Probable interests.
   1. 20 per cent farming and farm machinery, and work in concrete.
   2. 5 per cent in electrical problems.
   3. 10 per cent in automobiles and their repair.
   4. 25 per cent in useful projects especially in wood.
   5. 10 per cent in novelty of using tools, especially in woodworking, where the resultant of their work is visible.
   6. 15 per cent interested in order to get away from academic work.
   7. 5 per cent interested because the other boys are interested.
   8. 10 per cent without interest, but curious, and unable to state why they are taking the work.

   Note:—Groups six, seven and eight might form a group by themselves of uninterested or of indifferent interest to practical art work, but tending toward a mediated interest in this work.

F. Intelligence rating.
   1. Above normal, interested especially in books, scout craft, automobiles, wireless, etc.—25 per cent.
   2. 50 per cent generally well-informed and intelligent.
   3. 25 per cent below grade because of sickness, inability to attend school or other similar causes.
   4. 5 per cent just dullards.

II. Reasonable Assumptions.

A. 1. 1½ hours each day in a continuous period. (Two hours is too long.)
   2. School attendance 150 to 180 days.
   3. Two school years.

B. Work compulsory in seventh grade, and first half year of eighth. (In this outline the supposition is that shopwork in benchwork in wood has been pursued for two 1½ periods each week in the sixth grade.) No exceptions regarding admissions or exclusions.

   4. In case a boy is in the same grade two years:
      1. If proficient, have him assist others.
      2. If not proficient, have him make projects commensurate with his ability, for himself, school or instructor.

C. Good availability of cooperation facilities, external to school.
   1. Machine shop, wood-working shops, newspaper plants, waterworks and electric light plant, etc.
   2. Business men in banks, stores, etc., and professional men who will come in and lecture.

D. Optimum school conditions.
   1. Department allowed reasonable demands, such as circular saw, planer and mortiser, combined, or separate small power saw, small planer, (mortiser is not needed in

7th and 8th grades): wood-working benches and tools; electric wiring equipment; a printing press large enough to print school paper and general school printing; equipment for working in concrete; and large supply of literature and such and allied subjects.

III. Objective of Course.

A. Promotion of an amateur interest with an avocational and vocational tendency, mainly, to ascertain whether or not one is interested in any particular phase, and, to satisfy one's desire to make those things one's desires, or needs.

1. To have pupils do whatever they do in a worth while way. (The instructor must decide the worthwhile way, but, it is generally to be considered when the pupil has done a job to his own satisfaction.)

2. Other studies, "correlation centers," for practical-arts work, especially spelling, English compositions, etc.

3. Pupils should incorporate good designs—utilitarian first.

4. Ability to incorporate appropriate woodcarving, mostly line carving; ability to properly proportion masses of printing; observation of proper conventions in electric wiring; some line delineations and stampings in concrete; etc.

5. Elimination of crude work or results.

6. Necessary knowledge of appropriate woods, appropriate stains, finishes, knowledge of electricity, inks, machinery, grades of cement and of concrete, etc.

7. Confidence in ability to
   a. Sharpen tools,
   b. Repair and mend simple projects, and
   c. Contrast projects commensurate with their ability.

IV. Means and Methods.

A. Out of school projects.

1. Attainment of second class scout at end of seventh grade.

2. Attainment of first class scout at end of first half of eighth grade and merit badge in carpentry, electricity or other craft work, before the completion of the eighth grade.

3. Repair of or making of some handwork project at home each half year.
   a. In lieu of number three the completion of extra project in school shop will be insisted upon.

B. School productive projects, utilitarian as much as possible, but interesting, even though a mediated interest.

C. Experiments by instructor in strength of woods, stains, kinds of finishes, qualities of inks, electricity, grades of cement and concrete, etc., as well as to cause pupils to ascertain why chestnut and cypress are used for poles, posts, etc., instead of oak, or other woods, and, ascertaining such utilitarian values in other lines.

D. Specific drill and illustration by instructor, then by pupils, to be done in full size or in miniature, in complicated or difficult processes involved in a project following.

E. Requiring each pupil during term report on pamphlet, book on some practical art or arts, magazine, etc., particular hobby, preferably along the practical art line.

F. General reading in "Popular Mechanics", "General Science", or similar magazines, on which instructor should question at regular intervals.

G. Monthly lecture and discussion, on results of shop visitations and vocational openings, on readings, demonstration of new project processes. This may be necessary bi-monthly some months.

The above is a case group for white boys—or, mixed, where there are few colored boys—of many southern and inland towns of the United States. It might just as readily apply to colored boys only. In industrial centers, it would not necessarily apply as here, a great number of foreigners and of foreign descent, as well as of poor parents are usually to be contended with. (The writer makes these deductions necessarily from facts of his teaching experience in New Brunswick, New Jersey, three years; Sheridan, Wyoming, one year; and, Dover, Delaware, one year, as well as from trade, travel, army, college and discussional experiences. He insists, however, that the objective remains the same for junior high school work, although the case group varies.

PROPOSED COURSES FOR BOYS IN THE JUNIOR HIGH SCHOOL, 7th and 8th GRADES.

I. Bench-work in Wood.

A. Seventh grade.

1. Sand-block. (A block on which to wrap sandpaper for sanding.)

2. Bread Board.

3. Foot-stool, small bench or washbench.

4. Knife and fork box, tool box, or other box-construction project.

5. Waste basket, involving designing, staining and finishing.

Advanced should be encouraged to do some line carving on this project.

6. Flower stand.

7. Window box or boxes.

8. Clothes tree.

9. Gauged tray for pens, pencils, etc., or for fruit.

10. Making of some project about as difficult as above as needed at home or by school, such as dressing screen, window screen, chicken coup, hog-trough, feed hopper, etc., or

11. Duplication of any one of the above projects. (Note-C, below).

B. Eighth grade.

1. Ironing board, wash bench, sink drain board, etc., any one.

2. Window box or plant stand.

3. First aid or medicine cabinet.

4. Foot-rest upholstered in leather, fabrikoid, cretonne, etc.

5. Kitchen or library table.

6. Book case.

7. Election or duplication of any project commensurate with student's ability.

[3]C. Mechanical drawing of one project each month made by class as instructor same on the blackboard.

1. During the second half of the eighth year's work, inked drawings and tracings are made.

II. Work in Concrete. (One-half term or 1 term work.)

A. Either seventh or eighth grade.

1. Making fence posts.

2. Trough.

3. Making of concrete blocks for buildings or their foundations.

4. Pouring foundation for building.

5. Laying some pavement, curb, etc., for one student, or other party.

III. Work in Electrical Projects.

(½ term or 1 term work).

A. Either seventh or eighth grade.

1. Installation of an electrical bell or a system of them.

2. Making wireless set, preferably one boy in charge of group project.

3. Making of a motor.

4. Election of special practical project.

IV. Printing. (1, 2, 3, or 4 terms' work.)

A. Either seventh or eighth grade.

1. Printing of school stationery.

2. Printing of school paper.

3. Printing of circulars and other practical work in printing.

4. Printing of work needed by English, history and other departments.

V. Drafting. (One term or two terms' work.)

A. Eighth grade.

1. General, of miscellaneous projects in wood, auto, and metal parts.

2. Map and road drawing, mostly conventions and details.

3. Architectural drawing of some chosen project.

4. Mechanical drawing of machines and machine parts.

Note:—½ term, 1 term, and 2 term units should be offered under 1, 2, 3 and 4, as well as a one term unit, a combination of the four.

[3]Whether or not previous project has been completed, each must make this drawing. A feasible plan is to make one drawing each month on the first appearance of the class for that month.

VI. Engines in Every Day Use. (1 or 2 terms' work.)
A. Eighth grade.
1. Taking a part and assembly of such engines as used on the farm, at home, in one's car, etc.
2. Dissection of home electric plants, acetylene plants, etc.
3. The fundamental theory of different engines.
VII. Home Gardening. (One-half term credit Course.)
A. Seventh or eighth grade.
1. Care of own garden.
2. Complete data kept of garden.
3. Election of pig, chicken, rabbit or other animal project on which complete record is kept and turned in for credit.
VIII. Specials. (One-half term or 1 term.)
A. Seventh and eighth grade.
1. Cobbling of own shoes or family's such.
2. Harness mending.
3. Election of similar specials.

OUTLINE OF WORK IN DEPT. OF INDUSTRIAL ARTS OF DOVER, DEL., HIGH SCHOOL.

A. High School, Elective Work.

I. Shopwork, same as, or continuance of, work of first term.
a. Time 9 to 10:30, 5 days each week.
b. Projects.
1. Mechanical Drawings of, and,
2. Making of any advanced projects in woodwork needed by the boys at home or by the school.
c. During the first six weeks of the term, the boys made for the school—
1. One 30′ 0″ bicycle rack.
2. One typewriting table.
3. One 14′ 0″ table, for bookkeeping department.
4. Two 14′ 0″ tables for agricultural department.
5. Two 7′ 0″ tables, for agricultural department.
6. Put up four book shelves for agricultural department.
7. One permanent book case for high school dept.
8. Two large window screens for home economics department.
9. One large wash-bench for home economics department.
10. Two sandtables for first and second grades, and,
11. One grandstand 18′ 0″ long with six permanent benches 16″ above each other, 18″ wide; made partition and screen in front of same and put up basket ball backs.

II. Mechanical Drawing.
a. Individual Plates in
1. Plans of buildings.
2. Elevations.
3. Perspective of buildings.
4. Machines and machine parts (Subjects to be brought in by the students.)
5. Road maps.

3. The first term's work consisted of general drafting, consisting of:
a. Plates in—
1. Lettering.
2. Conventions.
3. Geometric constructions.
4. Development of elbows.
5. Prisms.
6. Isometric drawings of joints.
7. Drawing of bolts.
8. A machine part, and,
9. Floor plans and elevations for a house.

Brush Making Developed as a Fine Manual Art

Louis J. Haas, Director of Occupational Therapy, Bloomingdale Hospital, White Plains, N. Y.

Brush making as a handicraft has had a long and steady development. It began at the time when a few switches or twigs gathered together into a bundle and bound with a strip of bark, a thong of raw hide or even a pliable twig, became a brush to sweep the ashes from the humble hearth stone. Today we have brushes designed for every conceivable purpose; brushes of hair and bristles or other materials produced by hand, or with the aid of machinery, or by machines alone. To trace the craft's development from this simple beginning to the present state of perfection, would undoubtedly be intersting and profitable. Much time and thought might be given to the study of the various machines which are used today to produce brushes quickly and cheaply but neither of these is the real reason for presenting the following data.

For a number of years in many places throughout this country there has been developing the tendency to use the craft of making brushes by hand, with certain educational, retraining and curative purposes in mind. From the first in each of these different fields of endeavor, the work started with the making of simple scrubbing brushes of tampico. These brushes were only fairly satisfactory from a utilitarian point of view, and the nature of their construction limited the work to a few styles of brushes. The work thus limited was only more or less successful, being most handicapped where used for educational and curative purposes. Thus many hospitals have used brush making by this simple method as an occupation, with its therapeutic value uppermost in mind. Certain training schools have developed it as a vocation. More recently certain special classes organized in some of our normal schools for the training of children who may be classified as high grade morons, have presented brush making as a part of an effort to train these children to use their hands in constructive work. The last mentioned use of this handicraft has perhaps met with less success than the other two uses mentioned. This is doubtless due to certain difficulties peculiar to these students, but is more probably due to the limitations imposed by the process of construction used. Were it possible to infuse the work with the added interest which a greater variety of brushes would bring, giving thought to the designing of brushes for many purposes, carefully studying finish as well as utility, undoubtedly a larger measure of success would follow.

The system of designing and making brushes described here, was the outgrowth of using brush making as a therapeutic occupation and appreciating its limitations. As soon as the initial effort was made to improve the work from a constructional point of view, it was found that one-by-one the different accepted stages of production were discarded and others developed. After three years this work has passed from the pioneer stage of an experiment to a tried and proven process of value.

From a craft containing two, or three possible problems, it has changed to one embracing an unlimited number. The change in technic has made possible a perfection that not only spells added usefulness, but also more pleasure which accompanies quality of finish. From a craft that could hold the interest of those it was to be presented to for only short periods, it has changed to a craft which can hold the interest for satisfactory periods of time.

Before explaining in detail the designing and construction of the different types of brushes, it may be well to show just wherein the new system or method, differs from the old. Plate No. I shows in drawing "A" the old style scrub brush. Some workers bought these brush blocks already drilled, while others made and drilled their own blocks. White wood was usually used, being cut to shape and filed and planed to fit the pattern block. These blocks were center marked with a master block and drilled, the holes passing all the way through the brush block. The master block was just a block of hard wood the shape of the brush, with nails driven through it and extending 1/8" from its face. This block was backed and flanged with sheet iron. The master block was placed over the brush block to be marked, and struck several blows with a mallet. The blocks thus marked, if carefully drilled, were fairly accurate but it is clearly seen that much margin was allowed for careless workmanship. Tinned soft iron wire about No. 26 gauge was used to draw in the tampico needles. When the back was tacked in place and sand-papered, the brush looked good if carefully made. In service the moisture soon warped the back, so that it came off and the swelling bristles often split what remained of the brush.

The desire to make other styles of brushes started the experiments. It was clearly understood that whatever changes of construction were made, it was essential that all the work must be possible without the use of machinery. Machine made brushes were carefully examined with the idea of adapting their construction to hand processes. This led to the following form of drilling; the block was drilled about two-thirds or three-fourths of the way through with a large drill and then drilled the rest of the way with a 1/32" drill, as shown in drawing "B", plate No. I. The old master block was discarded and a carefully designed jig was made of No. 18 gauge sheet iron or steel and used for the first drilling. This eliminates the possibility of imperfectly drilled blocks. Soft brass wire of either No. 28 or 30 gauge was used for drawing the larger brushes. In starting the drawing of the bristles a piece of wire was cut long enough to draw the full row and make a tie at either end. The brush is held in a small vise clamped to the work table, thus leaving both the worker's hands free to draw the bristles.

First, the end of the wire is passed into the small hole in the back of the brush block at one end of the center row. It passes on through the enlarged part of the hole through the block. The wire is now returned back through the same hole, forming a loop, and just enough bristles are placed within this loop to fill the hole when drawn in. The bristles are bent in the middle about the wire, the two ends of the group of bristles being brought together, pinched and held firm between thumb and fore-finger of the left hand. Now with the right hand, gently pull both ends of the wire, while at the same time pushing the bristles until they slip all the way into the hole. If not enough bristles have been placed through the loop of wire to snugly fill the hole, a few more must be added. Experience soon develops almost automatic selection of proper sized bunches of bristle.

Now pull the wire gently until about two inches remain at one end for the tie, and proceed. Take the wire through the next hole and draw all the way through until it is tight against the back of the block before returning it to make the loop. Place the bristles and draw in, continuing thus until the end of the row is reached. Tie the wire thus; take the end of the wire remaining at the start and raising slightly the section of wire on the back of the brush between the first and second holes, pass this end under it and pull up close to the wire entering the first hole. Take the wire around and under the raised section of wire again, but this time on pulling up against the first hole, carefully twist the remaining end of wire off.

The drawing e, f, g, plate No. 2 explain the above and just what has been accomplished by tieing in this way. Each end of the wire is tied as just described. Each row of bristles when drawn is trimmed to the desired length with a pair of large cloth scissors before the next row is begun. When the brush is drawn and

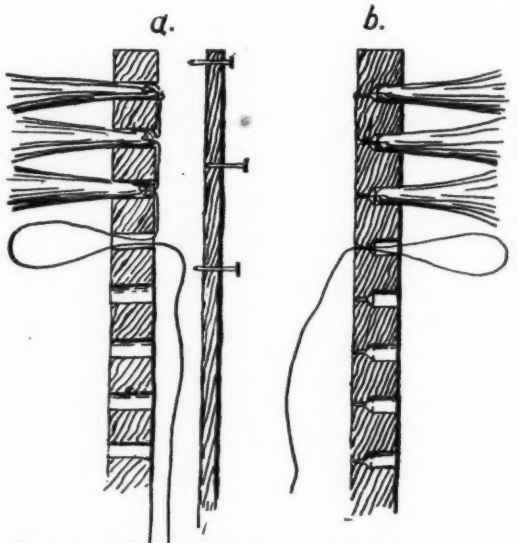
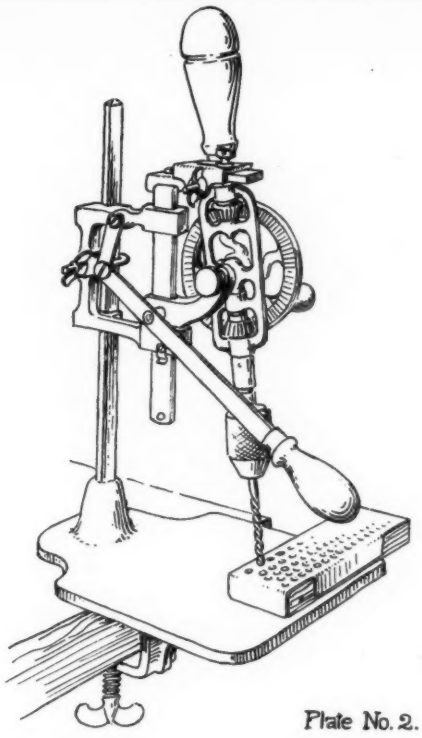
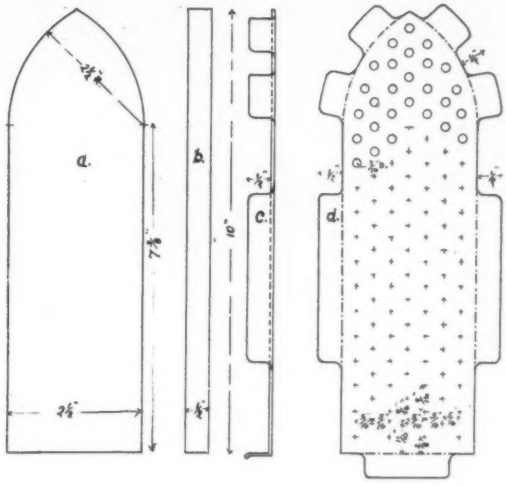


Plate No. 1.





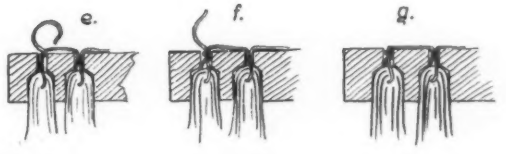


Plate No. 2.

trimmed, support on the edge of a table, or between the jaws of a vise, and with the flat, smooth head of a hammer, burnish the rows of wire into the soft wood. The back may now be sandpapered very carefully so as not to break the wire. Shellac or finish as desired. The above described change in construction of brushes in general, and the fact that the drilling jigs were used for each type of brush made, is the secret of the development of brush making into a fine manual art.

The scrubbing brush is the natural starting point for the study of brush making. While the students in the training schools and hospitals need give little thought to the study of design and the planning of brushes, much study should be given to this side of the work, if its educational value is to be developed. Thus, even the simple scrubbing brush presents structural details which should be studied and their relation to efficient use explained. The block must be strong enough; it may be square at both ends, but there is much in favor of the toe and heel type for all around use; the holes must be large enough to contain sufficient bristles to make a hard, stiff brush; the holes must be placed far enough apart to facilitate cleaning and drying as this spells long life for the brush; the holes must not be so far apart as to weaken the stiff surface the brush must present to perform its function. As a stiff surface is desired, there should be no flare to the rows of bristles except at the heel and toe to facilitate the reaching of edges and corners. It is clear how profitable it is to approach the work thus, without taking further space to point out the principle involved in designing brushes for different uses. Those interested will note that in certain brushes the features which make for greater usefulness are all-important, while in many others there enters the opportunity to study structural beauty.

Drawings "A" and "B", plate No. 2, show the patterns for a scrub brush block to be made of white wood. Drawing "D" is the plan for the drilling jig. When the jig is cut out and drilled the tabs are carefully bent up on the dot-and-dash line, as shown in drawing "C". The block is placed in the gig and drilled, the drill press being set so that the large holes cannot be more than the required depth, three-fourths of the way through the block. When all the large holes are drilled, the jig is removed and the smaller holes are drilled through the centers of the large ones. Flat drills made of large sewing needles are most satisfactory for drilling the small holes. After the drilling is completed the block is sandpapered on both sides to remove the bur edge left by the drills. Scrub brush and some nail brush blocks are now waterproofed by dipping the blocks into a tray containing linseed oil. The blocks are left in the oil only a few moments, being then removed and placed upon a rack to drain and dry. When the block is dry the bristles may be drawn. It is hardly necessary to point out that the making of all these brushes begins with the cutting and shaping of the block and ends with the finishing of the brush back. For scrub brushes, heavy tampico needles cut 3¼″ or 3½″ long are used for bristles and there are drawn with No. 30 gauge soft brass wire. The drawn bristles are cut to a line ¾″ or 1″ from the block.

The nail brush, drawings "A, B, C, and D" in plate No. 3, is a similar problem to the scrub brush. White wood is used for the block which may be drilled with some flare radiating from the center toward all edges of the brush. A No. 3 needle should be used for drilling the small holes and the bristles may be drawn with as fine as No. 32 gauge soft brass wire. This brush may be water-proofed with oil or it may be sanded, shellaced and varnished. The bristles may be either 3½" length heavy tampico needles, stiff horse hair or bristles. The drawn bristles are trimmed to ⅞" in length. Sometimes one outside row of bristles is cut to ¼" in length for purposes requiring extra stiffness.

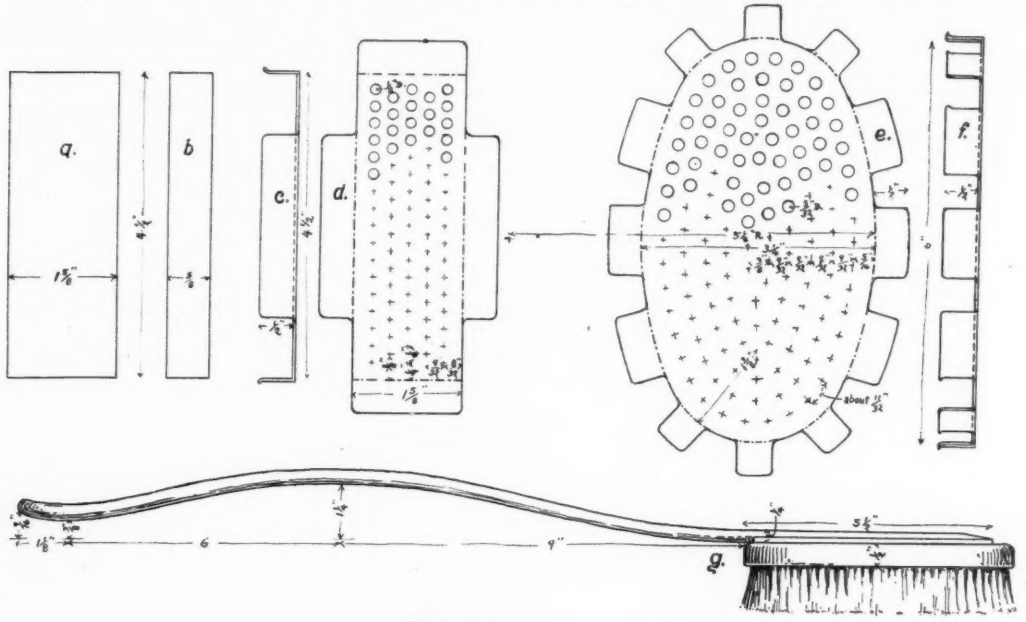
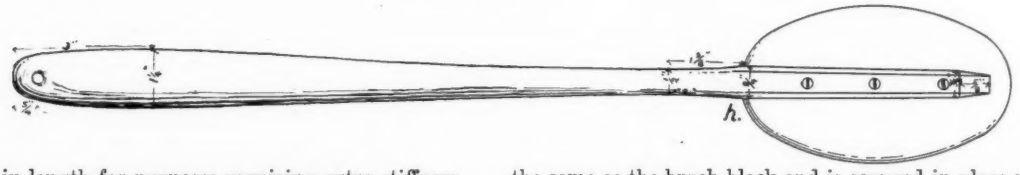


Plate No.3.



Drawings "E and F" show the details of the drilling gig for the bath brush shown in drawing "G and H", plate No. 3. This brush block can be water-proofed with oil before drawing or it may be finished in shellac and water-proof varnish after the bristles are drawn. There is no need to flare the bristles in this brush so all holes can be drilled at right angles to the face of the block. After the large holes have been drilled, sand the face of the block and clean all the dust out of the holes, giving this face one good coat of thin water-proof varnish, and working it carefully into the holes. When the block is dry, drill the small holes with a No. 3 needle made into a flat drill. White or white and black 3½" horse hair should be drawn for the bristles. Soft brass wire No. 30 gauge has been used to draw these bristles, but there is a possibility that some other material, perhaps a wax thread, would last longer. Some toilet soaps have a corroding effect on this wire that has been noted only in bath brushes. When the bristles are trimmed, the back of the brush is given one coat of shellac and two coats of water-proof varnish, being rubbed down with sand paper between each coat. The handle can be made of white wood, ash or maple and bent on a heavy oak board with the aid of pegs placed in holes properly arranged in this board. The handle will need steaming or soaking in hot water (if steaming is not convenient) before the bending is attempted. When the piece of wood is bent, dried and shaped, the handle is finished the same as the brush block and is screwed in place upon the block with three nickled, brass screws.

Little need be said about the radiator brush, as the drawings "A, B, and C", plate No. 4, explain everything the worker need know. The shape is decided by the use to which the brush is placed. The curves have been studied so that a number of blocks could be cut out of the same piece of wood, a single cut making one side of two blocks. The curves, top and bottom, are identical, the top curve being afterwards cut to form the nose of the brush. As will be noted the small holes are drilled out through one side of the brush block. Horse hair cut 7" long is used to make this brush.

The clothes brush, drawing "H", plate No. 4, is but a longer block of the same width as the nail brush and but a little thicker, shown by drawing "E". The jig pattern shown by drawings "F and G" show that the

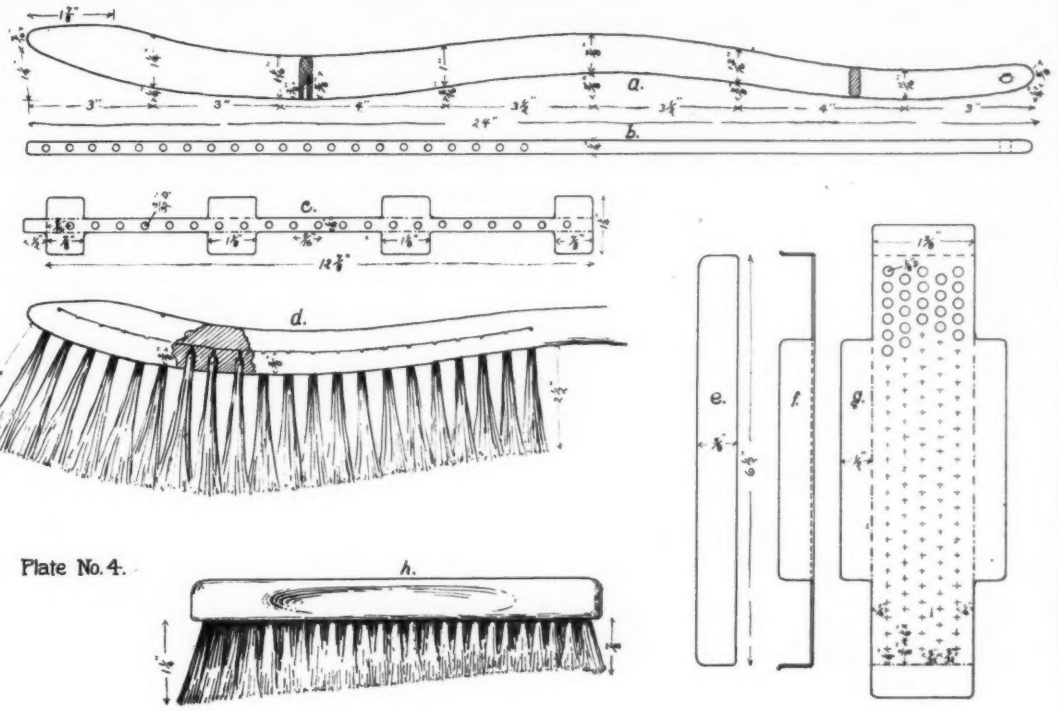


Plate No. 4.

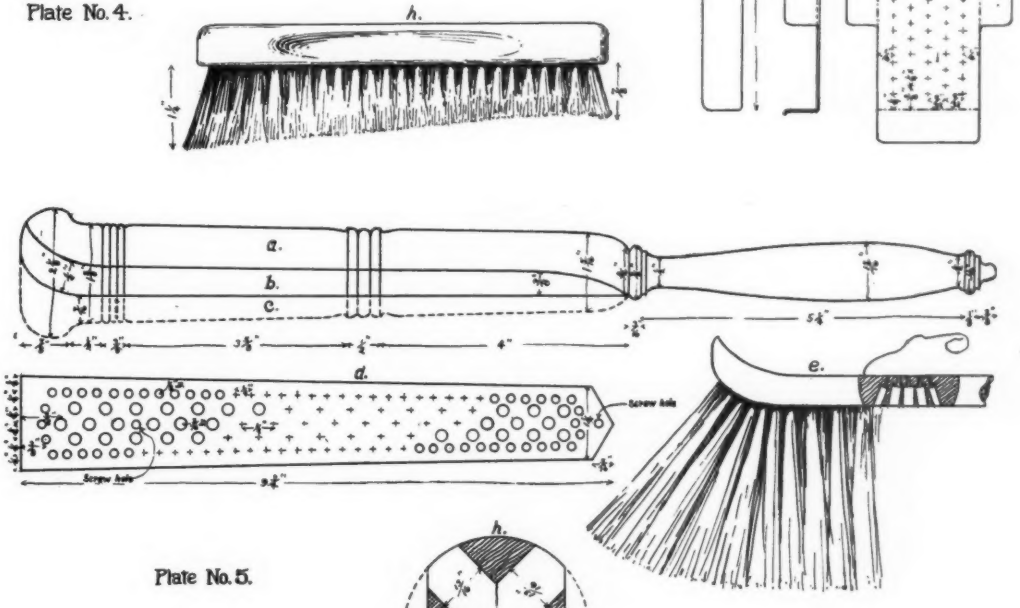


Plate No. 5.

holes are the same size and arranged as were those in the nail brush. The holes should be drilled with quite a flare. After the bristles are drawn and trimmed and the wires burnished into the wood, finger grips are cut into each side of the brush block, see drawing "H", plate No. 4. The block can now be stained and polished or finished the natural color of the wood. If the brush block is to be stained, the face of the block should be stained prior to the drawing of the bristles. The drawn bristles may be cut to a line 1″ from the block, or as shown in the drawing "H", where one end is very flexible being 1¼″ long and the other fairly stiff being cut ⅞″ long. The shorter end is designed for cleaning off mud spots while the more flexible end removes the dust. Horse hair 3½″ long is used for the bristles of this brush.

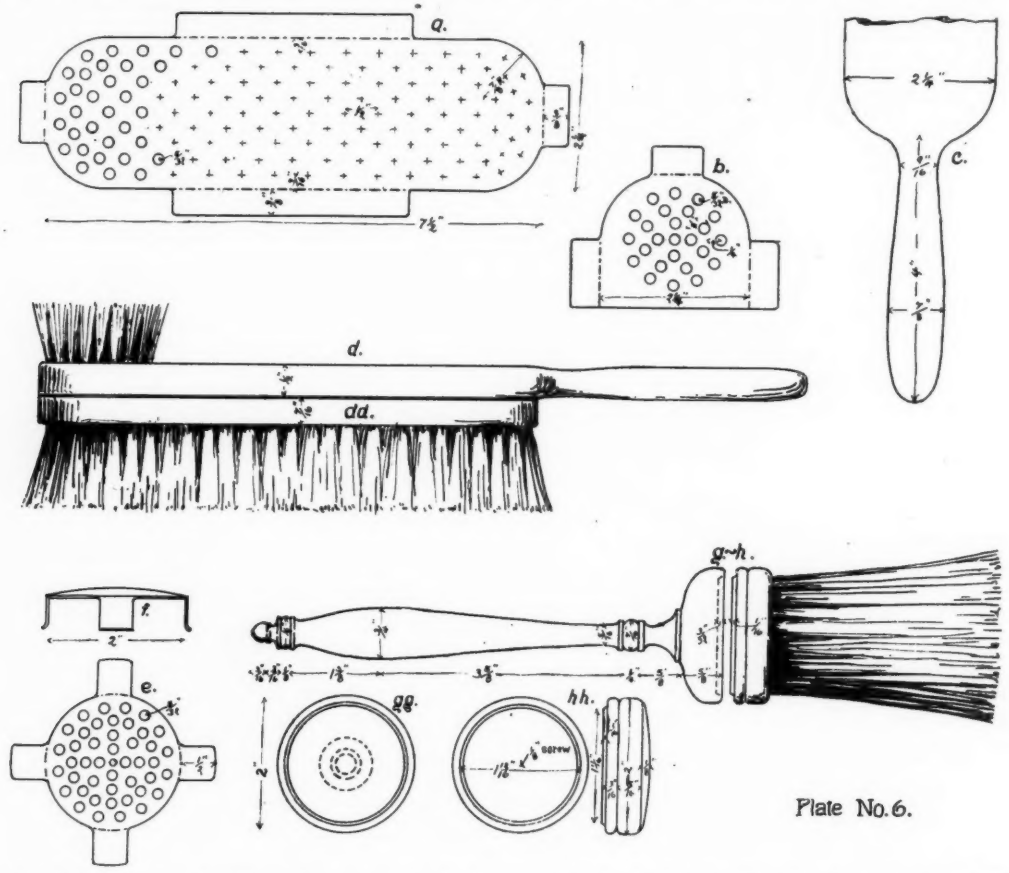


Plate No. 6.

The counter sweep block could be turned out of white wood, but maple is preferred. After being turned on the lathe and finished with sand paper, the dotted portion marked "C" in the drawing, plate No. 5, is cut to waste to the full line shown between "C" and "B" in the drawing. This surface becomes the face of the brush block. Now the brush block proper marked "B" in the drawing, is cut from the back and handle marked "A" in the drawing, the band saw following the line located between "A" and "B". The drilling jig, drawing "D", plate No. 5, is now attached to the brush block "B" with two small screws placed in the holes, in the jig, marked "screw holes" in the drawing. The holes are drilled, flaring each row as you leave the center, being straight up and down length-wise, except where they flare forward to form the nose of the brush (see drawing E). This brush is drawn with No. 28 gauge soft brass wire and 7″ length stiff horse hair for bristles. Usually the three inner rows are in black hair, and the outside row, in white. Trim the brush level, leaving the bristles as long as possible. The brush looks best finished natural color, shellaced and polished. The brush block is held to the back and handle with two screws which are placed in the holes reserved for them in the jig.

The backs for the floor brushes, drawing "F" plate No. 5, are turned in pairs. Cut two pieces of white wood or cypress 19″ long by 2½″ wide and 1¾″ thick, and fasten these with the 2½″ wide surface together, using two screws placed ¾″ from each end. Now center the piece and place in the lathe and turn to the dimensions given in drawing "F", plate No. 5. When the turning is completed, cut off the surplus stock at each end and the two floor brush backs are completed but for the drilling of the holes to receive the threaded maple handle. These holes are drilled through the back at 45 degrees as shown in the section drawing, "H", plate No. 5. These holes are drilled just 1/16″ smaller in diameter than the threaded end of the handle. The hard

maple of the handle will cut its own thread in the softer wood of the brush back and be held securely in place. The brush blocks, drawing "G", plate No. 5, are cut from ½" white wood and are drilled with the rows flaring away from the central row and radiating about the ends to form the double toes. The drilling jig has the flanges bent up on the dot-and-dash line to receive the brush block for drilling. The brush is drawn in black horse hair except for the smaller holes at the sides and ends, which are drawn in white horse hair, both materials being 7" long. Soft brass wire No. 28 gauge is used to draw the bristles. The brush is trimmed so as to leave the bristles as long as possible and is then attached to the back with two 1¼" screws placed in the holes marked for them in the drilling jig. This brush is best finished in the natural color of the wood with shellac and varnish.

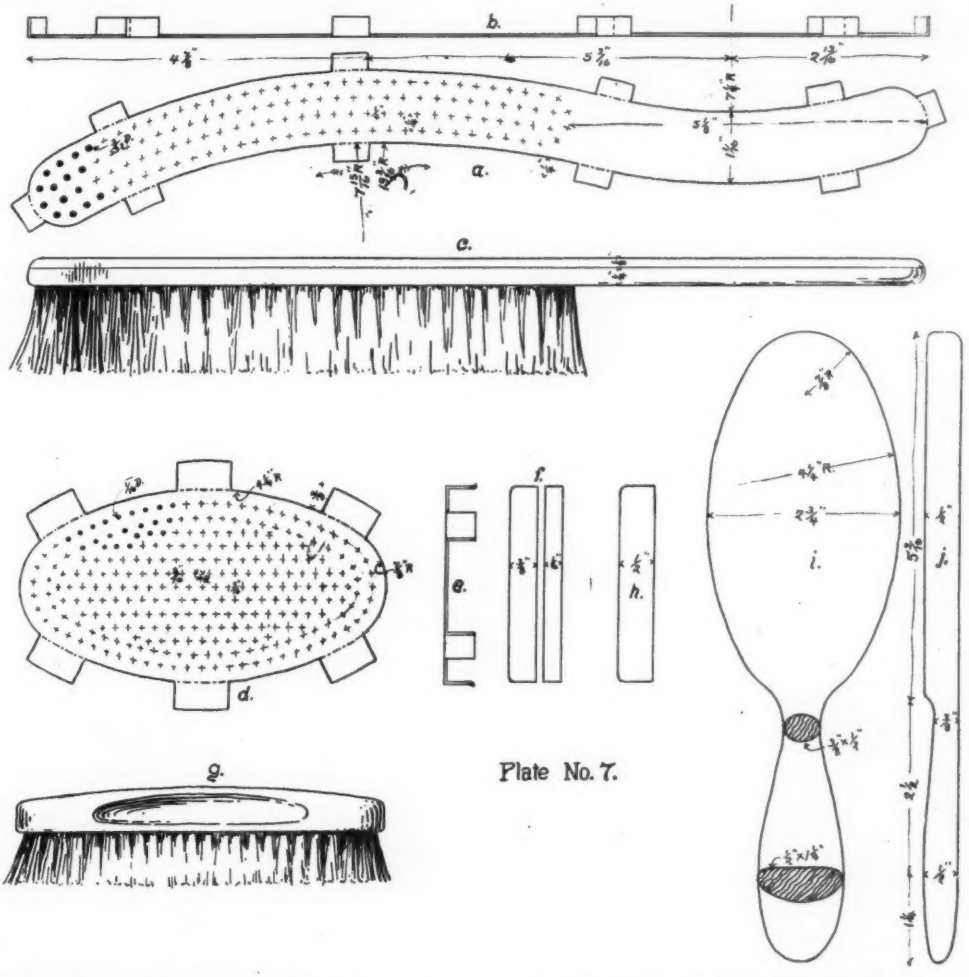


Plate No. 7.

The drilling jig, drawing "A", plate No. 6, has been used for three different brushes; namely, a large clothes brush with finger grips in the sides, a shoe brush without handle, and a brush of the type shown in drawings "D" and "DD" with handle. Where used as a clothes brush the block should be ⅝" or ¾" thick, if no back is to be attached. If the brush is to have an arched back attached, ½" is thick enough for the block. The back, a piece of wood ⅜" thick, is glued in place after the drawing of the brush is completed. Whenever a brush is to have a back glued in place it is necessary before drawing the bristles to cut shallow connecting grooves in the back of the brush blocks, to receive the wires. This insures the perfect fitting of the two surfaces to be glued. A number of very small iron clamps is used to hold the brush and back together while the glue sets. Now the back is cut arched, shaped and the finger grips cut in the sides, and the block may then be finished as desired. The clothes brush should be drawn in black hair or bristled and trimmed with two outside rows in white or the whole brush should be drawn in white horse hair or bristles.

The shoe brushes can have slightly heavier backs and should be drawn in black horse hair or bristles only. The bristles should be quite stiff. These brushes which have handles should have daubers drawn in the other end of the block that forms both back and handle. Drawing "B", plate No. 6, shows the drilling jig used for these daubers. The daubers should be drawn of

stiff black bristles. Soft brass wire No. 30 gauge is used to draw these brushes.

Drawings "E" and "F" show the jig used in drilling the brush block shown in drawing "H" and "HH", plate No. 6, which when attached to the turned handle, drawing "G", forms a barbers' brush. Both brush block and handle are turned out of fine grained maple or box wood. Examination of drawings "G" and "GG" show the end of the handle to contain a recess, turned 3/32" deep, which is designed to receive the flange, turned 1/16" in height on the brush block, as shown in drawings "H" and "HH", and just leave clearance for the wire. Thus when the brush is assembled, a 1¼" screw placed through the hole reserved for this purpose in the center of the brush block, holds the brush and handle firmly together. This brush should be drawn in fine white hair, 7" in length, and trimmed so as to remain as long as possible. Use No. 32 gauge soft brass wire to draw the bristles. The brush can be finished in the natural color or stained and then shellaced, varnished and polished down.

The brushes shown in plate No. 7 might be made in white wood blocks, but their uses suggest woods of finer quality and possessing more beauty when carefully finished. A very fine quality of hair cut 3½" long should be used in making the crumb brush shown in drawings "A, B, and C", plate No. 7. The color should be either white or black, the preference would seem to be for white hair. The bristles are drawn with No. 32 gauge soft brass wire. This brush looks well in the natural color of the wood and highly polished, but the finish should be made to harmonize with the crumb tray or other table accessories with which it is to be used.

The jig, drawing "D", plate No. 7, is designed to be used in drilling both the military and the handle type of hair brush. Both brushes can be made without attached backs or with backs glued in place. When backs are to be glued on, be sure to cut the shallow grooves for receiving the wires in the backs of the brush blocks. Where no backs are to be attached, do not groove the blocks, but carefully burnish the wire into the surface of the wood. Only finest quality of white and black bear's bristles of 3¼" or 3½" in length must be used, drawn with No. 32 gauge soft brass wire. Every care should be taken to shape and finish these blocks perfectly, as the use to which the brushes are to be put and the material of which they must be constructed, demand it. Where the brushes are to be unbacked, the smaller holes through which the wire is to pass should be made with just as fine a needle as will possibly permit the threading of the wire through the brush block. Every care should be taken in selecting the right sized tufts of bristles, pinching and pushing, as well as pulling them into the holes, that the wires may not be broken midway of the rows. Against a rich background of dark polished wood, the unbroken rows of bright brass stitches have a fine decorative effect of which the worker may well be proud, the result justifying the effort.

Practical Use of Rules in the Print Shop

Charles H. McGinnis Instructor, Practical Arts Department, Forest Park Junior High School, Springfield, Mass.

EVERY teacher of printing is confronted with the great problems of grammar and spelling. It is needless to say how important these are in this subject; for what can a boy do in the print shop if he is not familiar with these rules; or is there another shop subject that deals so vitally with such rules?

I think I have solved my difficulty in the way shown in the picture. I printed on cardboard 8½" by 5½" in a 24 point type some of the important rules dealing with grammar and spelling. These rules were submitted by the English teachers and chosen by them and me only after a careful deliberation on the value of the rules, and on the way in which they help in the boys' daily work. I then built a long, narrow frame to stand upon the top of each type rack. Into these frames I placed ten of the printed rules. This frame was made so that the rules were duplicated on both sides, thus enabling the boys to see the rules on either side. As is shown in the picture the boys study the rules when they become puzzled, looking for the rule that applies to their own particular case.

These rules include grammar such as punctuation, capitalization and spelling. Examples of the rules are:

GRAMMAR RULES

A capital letter should begin

1. Every independent sentence.
2. Every line of poetry.
3. Every direct quotation.
4. All proper nouns, words made from proper nouns, or abbreviations of them.
5. Names and titles of the Deity.
6. Pronouns standing for the Deity.
7. Titles of honor.
8. Principal words of the title of books etc.
9. I and O

A Typical Card. The Original Is Set in 18 Point and the Card Measures 8½ by 5½ Inches.

I. When the first letter of a word is the same as the last letter of a prefix, both letters are kept.
Ex.: Misspell.

II. A capital letter should begin:
1. Every independent sentence,

THE CARDS ARE MOUNTED ABOVE THE TYPE CASES.

2. Every line of poetry,
3. Every direct quotation,
4. All proper nouns, words made from proper nouns, or abbreviations of them,
5. Names and titles of the Deity,
6. Pronouns standing for the Deity,
7. Titles of honor,
8. Principal words of the titles of books, etc.
9. I and O.

III. A comma is used to separate:

1. The terms of a series which have the same construction and are not connected by conjunctions.

Ex.: His hat, coat, shoes and gloves were found on the bank of the river.

2. Words in direct address from the rest of the sentence—

Ex.: Please take the other chair, John.

Spelling has improved wonderfully since I have had this arrangement

The thing that impresses our many visitors is our frame of rules. My boys and I have found this scheme such a great help that we would like to give others the idea.

EXHIBIT OF MANUAL TRAINING WORK AT LAKE LINDEN, MICH.

The splendid examples of furniture illustrated were produced under the direction of Mr. Henry J. Hansen, Lake Linden, Mich., and constituted the Third Annual Exhibit of the high school manual training department. The picture shows twenty drawing benches made by the boys this year, at a saving of $400. These benches have adjustable tops and three drawers and drawing-board lockers. Other pieces were made by the pupils of the evening class.

INDUSTRIAL-ARTS MAGAZINE

E. J. LAKE S. J. VAUGHN
Editors

EDITORIAL

WHY PAINFUL?

It is stated by the executive of the high-school of one eastern city that "getting most of our graduates safely past the college entrance requirements is one very definite project in our school." "It has been impossible to do more than introduce a course in mechanical drawing, one in freehand drawing, one in joinery; and for the girls, one in theory and rudiments of music, one in crafts, and courses in sewing and cooking." "We do not blink the fact that students come to us who are not given certain types of courses that will be more beneficial for them than what the colleges demand." "It is our painful duty to see that students get in college where their parents want them to go."

This high school official regrets that more pupils may not take courses that will give best educational results because they are busy with the definite business of getting ready for college.

We do not share in this regret or in the implication that a boy or girl is in the least unfortunate who looks forward to a college training even though some interesting and profitable studies may be sacrificed for college entrance requirements. We do regret that high school pupils who have no hope or intention of going to college are not given particular training for their future interests but are led or required to take work that is directed to the purpose of college entrance.

After many years of contention between high school and college executives over the matter it might be concluded that it is quite as much the business of the high school to offer work in the interests of the majority who do not go to college as it is to fulfill the college requirements laid down by a faculty which has a college course in mind.

If there is any basis for the selection of school work for a purpose there is no basis for requiring a majority to take work designed for the purpose of a minority.

The hope that considerable industrial or technical high school credit may be acceptable to a college faculty for entrance to colleges giving professional training in industrial and technical pursuits has long since passed.

The first year of technical college courses is largely academic and preparatory for advanced technical study.

Elementary technical study has been very largely eliminated from college courses. Freshman shopwork in wood and metal is disappearing from architectural and engineering courses.

College faculties grant little professional value to technical or even scientific study in the high school.

Meeting college entrance requirements is of course one obligation of the high school but under present conditions it is not by any means the most important obligation.

TRAINING THE CONSUMER TO RESIST THE SALESMAN.

So much emphasis has been placed in recent years on training for salesmanship that it seems time to begin the training of the consumers to resist the salesmen. This is another way of saying that the vastly important thing is to make the buyer or consumer conscious of his own needs and capable of selecting the commodities of proper quality, quantity, and price to meet those needs.

No sale is a wise sale unless the article sold meets adequately the needs and conditions of the purchaser. Similarly, no purchase is a wise purchase which does not measure up to this same requirement.

Too often, we fear, these considerations are lost sight of by salesmen in the stress of competition, in the desire for records or commissions, and in the anxiety to increase business by any device. The uninformed purchaser is often at the mercy of the skilled salesman, especially if the salesman is not operating on the principle that any good sales must be of *mutual benefit*. How many of us are price buyers with no notion of quality! How many of us are wholly dependent upon our tailors, our haberdashers, our grocers, our jewelers, and our bakers! It is their word which we must take, in our ignorance of quality and fair price.

The new generation may develop a race of *quality buyers*, thanks to the efforts that are now being made in the schools, especially in the courses in home economics. But for a long time, "bargain counters," "one cent sales," and other similar devices will flourish and the psychology of the ninety-eight cent "bargain" for a seventy-five cent article will exert a powerful influence in the retail business.

It is of primary importance, of course, that people be trained to be wise buyers and intelligent consumers. This type of buyer will be able to "resist the salesman."

While this is most desirable and is being attained, it is highly desirable and tremendously important that all who *sell* shall be actuated by the *service* motive, shall conceive every sale as a mutual advantage to both seller and buyer, and shall be content with a reasonable profit.

WHEN THE EXPERT TURNS REFORMER.

In a recently published volume, Roger W. Babson, the well known statistician and financial expert, offers some rather caustic criticism of education and the schools and outlines his solution to the educational problem.

His circumscribed and commonplace observations concerning education and his proposed solution to the difficulties furnish another example of the unsafe advice and criticism offered by an expert in a limited and highly technical field to those in an entirely different field. One is reminded of the expert on roller skates

who puts on skis for the first time and undertakes to travel with his accustomed ease and velocity. He finds the going not quite so good but the merriment he unconsciously furnishes the onlookers quite justifies the effort and inconvenience.

Mr. Babson says, "Schools are being operated largely not to provide education, but to take the children off their parents' hands for a certain number of hours a day. This applies to all schools, although especially to kindergarten, primary and preparatory schools. Colleges and high schools are largely being operated to give jobs to instructors rather than to help the students. Thus the incentive is to string out the course as long as possible and use as many textbooks as possible. Naturally, the textbook manufacturers are very sympathetic with this mistaken policy and help it along in every way possible." And so follow a dozen or more pages.

Think of a statistician indulging in any such statements! Think of impeaching the integrity of the teachers and school officials and charging them with a giant conspiracy with the textbook manufacturers "to string out the course and use as many textbooks as possible!"

We cannot resist the conviction that the entire chapter on "Need of Educational Reform" is completely at variance with both facts and fairness. It is an amateurish effort pitifully weak and depressingly unworthy of a man of the standing of Roger W. Babson. We share the feeling that a man who has won so enviable a place as that occupied by Mr. Babson in the field of business and finance is morally obligated not to capitalize his reputation and influence in an attempt to discredit the worthy institutions and faithful servants in another field about which his own statements show him to be grossly ignorant.

The schools welcome any constructive, fair-minded criticism from whatever source and have profited immeasurably by such criticism in recent years. But school teachers and officials will not submit without a protest to a charge that reflects on their honor, impeaches their integrity, and imputes to them the most unworthy of motives.

EXHIBITIONS

The open season for exhibitions is at hand. Now at the close of the school year we like to show our accomplishments by actual things done. Well and good! If we show honest work honestly done the exhibition will not only reflect credit on those who did it but it will lead others to do likewise. So we may not only satisfy our ambition but may do a real service by showing our work. This spring show should be the selected best of the series of exhibitions held through the year, or better yet, it should be the surviving best of a continual exhibition of work through the year.

American teachers of the industrial arts have not yet learned to take full advantage of the emulation and competition secured by exhibits of classwork. If there is any place in your classroom or shop where you can keep before your classes the best productions of each class, much has been learned by criticism and comparison. Let a little of the competition of real life into the classroom and shop. Awards and favorable mention are a wonderful incentive to work. The teacher can create a fine spirit of kindly criticism and help by a well conducted competition. The final exhibition of the year may well be made up of the winning pieces of work done through the year. The teacher may wisely bring others of good judgment to award these merits. Even the judgment of the class as a whole should be brought to bear in awarding merit. There is nothing which cultivates judgment like the responsible exercise of it.

RURAL ART AND HANDICRAFT.

The rural child who is removed from any but occasional contact with city or town life must get through his school instruction many of the things that the city child gets through experience. More than that he must overcome the lure of city attractions, and be shown the value and the possibilities of his own environment. To the rural school teacher falls the task of accomplishing this result, and every phase of the course of study should play its part.

The course in art and hand craft for rural schools should be planned to give the child as much insight as possible into the world outside his own community, but at the same time it should emphasize strongly the beauty and the inspiration and the opportunity that his own environment can give him. The art course can be made especially rich in its content, because of the great amount of interesting material available for models. Fruits, vegetables, flowers, birds, farm animals, farm occupations, trees and shrubs, farm buildings offer opportunities for studies rich in color and fine in line that artists the world over have sought out and used.

Much of the picture study given in the rural school may well bring out this feature.

The handicraft side needs special emphasis, and should be planned so as to give real pleasure and at the same time be practical. The rural parent has little time or patience the same time, no one can be more appreciative than he for a thing that does not give a tangible result, but at of the thing that seems worth while. The use of available material is essential and the ingenious teacher can and will use much of what she finds at hand. Sample books of wall paper may replace expensive construction paper in many problems. Gunnysack is a very satisfactory substitute for the high priced burlap and coarse crash, so often used in bags, pillow tops and runners. The decoration for such problems should be simple, and any attempt to use the cheap commercial ideas of design should be discouraged.

Where there is no manual training department, the making of simple toys from thin wood, and involving the use of the coping saw, is a problem of great interest to boys. In all making, the idea of good workmanship should be stressed, as well as suitable materials, and fitting ornamentation.

The problem of the rural teacher in art and handicraft is necessarily somewhat complicated. Her course of study is usually indefinite, her supervision not very frequent, her material and her time limited. Yet the thing is worth while if it opens to the children of her classes some of the wonders of their everyday environment.

MARIE CAREY DRUSE.

Hardness is the resistance a stone offers to attribition, being one devised by the Viennese mineralogist, Professor or being scratched by another body; the following scale Moh, for comparison. 1. Talc: 2. Gypsum: 3. Calcite: 4. Fluorspar: 5. Apatite: 6. Felspar: 7. Quartz: 8. Topaz: 9. Sapphire: 10. Diamond —Jewelers' Circular.

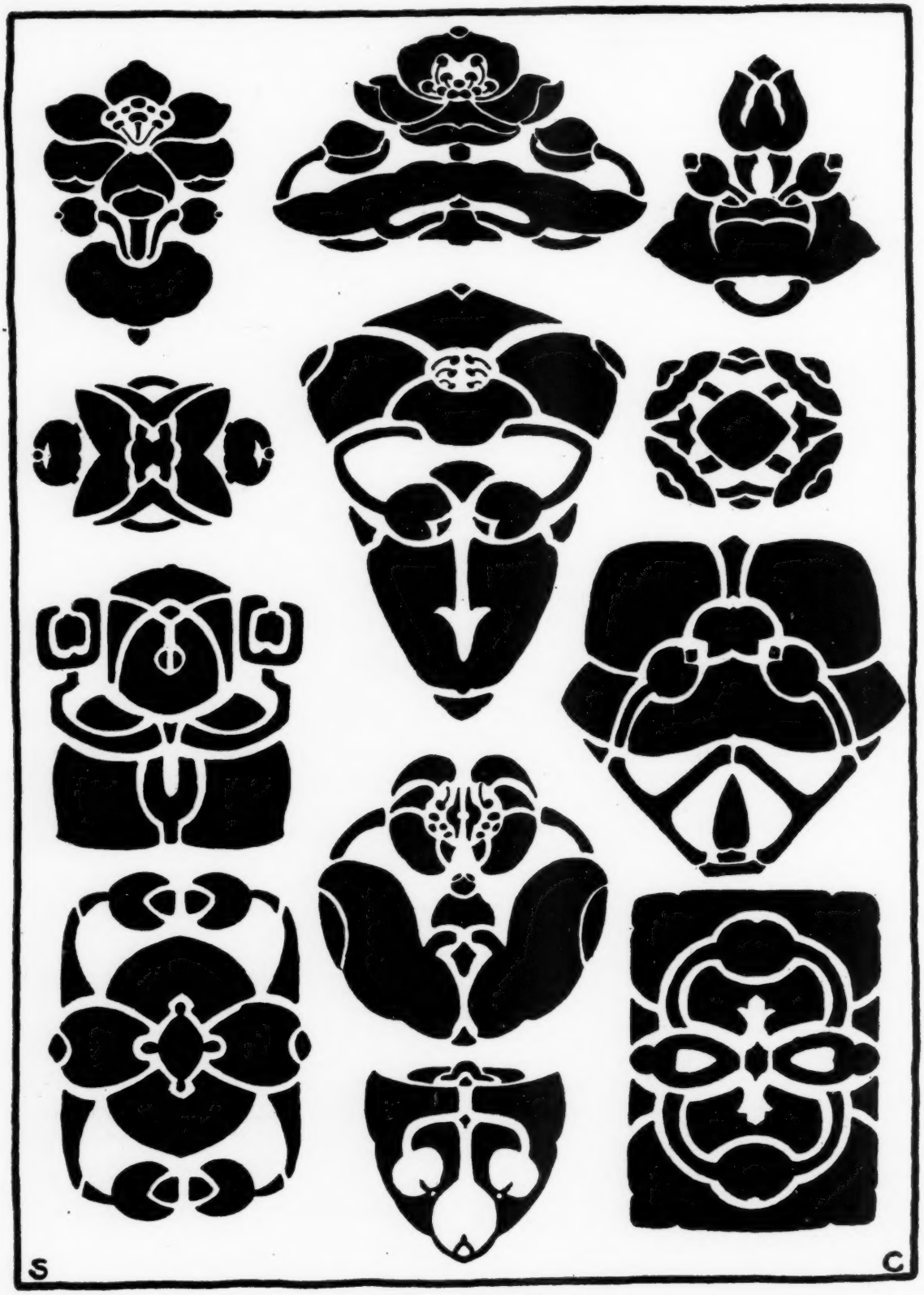


PLATE III

This plate, which illustrates designs developed from the Marsh Marigold, is the third of a series of twelve plates, by Miss Sara Cohoon, instructor of art in the Junior High School, Springfield, Mass.

A Household Mechanics Course

N. C. Tock, Director of Manual Training, High School, Wellsburg, W. Va.

(Continued from March)

Painting and Finishing of Interior Walls.

Object:

To teach how to choose colors for interior decoration.

To teach how to choose and mix paints for plaster walls.

To teach how to apply paint to plaster.

To teach what constitutes a good job of decorating.

Method of Presentation:

Emphasis will be placed on the study of color.

Problems will be given in the making of color schemes.

Actual practice in mixing and applying at least one kind of paint will be given.

References:

Sabin—Housepainting.

Advertisements.

Slogan: Combine Beauty with Sanitation and Durability.

Reasons for Decorating Walls:

To secure beauty, cleanliness and variety.

The pleasure of the owner in his property depends to some extent on its beauty and comfort. The use of the proper paint on the outside will add to its value and the use of the proper finishes on the inside will add to its comfort. So much of the beauty of a house depends upon the colors chosen for its interior decoration that we will spend some time in the study of the proper ones for different rooms so that the pupils' homes may profit by their knowledge.

There are two things that affect us in our choice of colors for a room: First; the exposure and use of the room and second, the relation of the room to the other rooms of the house.

Some colors have become customary for certain rooms; for instance, bedrooms are usually finished in pink, blue, yellow or light tints of other colors. Living rooms, halls and libraries are often finished in warm light tones of red, brown or green. Rooms that have little light are decorated in yellowish colors to give the suggestion of sunlight while sunny rooms are usually best when decorated in cool shades of green, blue and grey.

There should not be too much contrast in the colors chosen for adjacent rooms. The effect is disturbing to the feeling of harmony and separates the rooms too much. Rooms that are connected by open doorways are usually decorated alike.

If a color is mixed with white we get what is called a tint. If it is mixed with black or some other color, we call the result a shade; light or dark according to its density. There are three so-called primary colors that are not capable of being made by mixing. They are red, blue, and yellow. If any two of these colors are mixed we get secondary colors, which vary in tone according to the proportion of color used. If the three primary colors are placed at the points of a triangle and the proper secondary color placed between them, we get a color scale arranged in this order: red, orange, yellow, green, blue, violet, red. Colors coming next each other in the scale are said to be analogous, as red and orange; yellow and green. Various tones of green as yellow-green and blue-green would also be considered as analogous, and grey shades of a color would be analogous to that color. There is another kind of color scheme that is often met, called the complementary color scheme. The complement of any one of the three primary colors is found by mixing the other two colors. Red's complement is found by mixing blue and yellow giving green.

Analogous colors blend into each other in a quiet way and do not force themselves upon the attention. For this reason they are the best to use for decorating rooms. Complementary color schemes are bolder and are used mainly for accenting certain lines or spaces. A room decorated in a complementary scheme would appear crude and disturbing, as each color would be fighting for attention.

Application of Color Theory in Home Decoration.

The walls of a room furnish the background for the furniture and hangings. For this reason they must not be too insistent. As stated before, the colors for two adjacent rooms must be near each other in the color scale. The following offers an example of what use may be made of this idea.

As we walk into a well decorated house, we step into a hall with a room on each side of it. The hall is finished in brown, which is a neutral color and combines well with any shade. On one side of the house we are going to run into the red shades and on the other side we will run into yellow shades. The yellow colors are used on the north side while the red colors, which though warm, absorb a great deal of light would be used on the sunny side. The first room to the right of the hall might be finished in a yellow grey, or a green grey. The room next to that could be yellow green, tan, buff, orange-grey or yellow, depending on the light. The first room to the left of the hall could be in a gray, with a tinge of red mixed with it, or could be a light brown; sienna; or umber. Opening out of this room other rooms could be finished in rose, pink, reddish-buff etc.

The next thing to decide on is the color scheme within the room. Walls, ceiling and floor should fit together without much contrast. The walls and ceiling should be of the same color in different shades. As a rule the wall color is repeated in the ceiling but in a lighter tone. In a brown room, the ceiling should be a very light coffee color or cream color. White should be used only in rooms with white walls. A red room would have pink ceilings, a green room would have a very light green ceiling.

Another very important thing as far as the appearance of the room is concerned, is the color of the trimming. The trimming should be considered as part of the furniture rather than as part of the walls. In a light room the trimming should be fairly dark in color and vice versa. It should contrast with the walls just as the frame of a picture contrasts with the mat. The effect is to set the walls off as if they were in a frame and to give a more definite delineation to the walls. An exception is usually made in the case of sleeping rooms, where white or ivory woodwork is the rule. The effect wanted in a sleeping room is that of daintiness, which is best secured by using light woodwork and furniture with the light walls. In this case the woodwork should be in a contrasting or complementary color. White woodwork with white walls would not look as well as grey woodwork. White would look better with pink or light blue walls.

Problems in Color for Solution by the Class.

1. Pupils will make a color chart. Divide a rectangular sheet of paper, four by eight inches into one inch squares.

Laying the paper in a vertical position before you, color the top row of four squares with a light coating of red crayon. The second row orange; the third yellow; the fourth green; the fifth blue; the sixth violet. The seventh red; the eighth black giving a grey tint.

Go over the last three squares in each of the first six rows with a second coating of the same color; the third square in each row is to get a third coat while the fourth square is given a light coat of the complementary color to show what is meant by greying (mixing a color with its complement.)

The seventh row gets a coating of yellow for the last three squares and one of blue for the last two. The last square in that row is covered with a light coat of black.

The four squares in the black row are to get black coatings only. Shade them as evenly as possible from the light tint in the first square, to the darkest shade possible in the last square.

The chart will have to be made carefully and the teacher will do well to practice a little first so as to get the right effect himself. The charts are used later as reference when choosing color.

Problem 2. Drawing a plan of a house on the board, drawing on the board, naming the rooms. Pupils will copy the drawing and color in the space of each room, using colors from the chart, so that the colors coming next each other in the plan will come next each other in the chart.

Problem 3. Draw a corner of a room, showing doorway, on the board for pupils to copy. They will fill in the drawing with color showing the walls on the second room through the door and also showing the proper woodwork color for each room. Rugs may be shown also. They should be in the analogous relation but may have figures of complementary colors.

These drawings, incidentally, make a fine exhibit if well done, not only showing what the pupils are doing but also showing the visitors what is desirable in the way of finishes.

Study of Materials and Technique used in Painting Walls.

There are three common methods of painting the walls of our houses that the householder should be familiar with. They are:

Linseed oil and white lead painting.

Calcimining.

Painting with proprietary paints which come ready mixed except for the addition of water.

The method of application is about the same for each but as the mixing of the ingredients and the preparation of the walls differ; each will be studied individually before the way of applying is taken up.

Formulas for Mixing White Lead Paints for Plaster Walls.

(From National Lead Co.)

	Priming Coat	Second Coat
White lead	100 lbs.	100 lbs.
Linseed oil	7 gals. boiled	1½ gals. raw
Turpentine	1 gal.	1½ gals.
Drier	none	1 pt.
Sq. ft. it will cover	6500	3600

Third Coat	Flat	Eggshell	Oil Gloss
White lead	100 lbs.	100 lbs.	100 lbs.
Turpentine	2½ gals.	2½ gals.	¼ Gal.
Light enamel varnish	1 pt.	¼ Gal.	none
Linseed oil	none	none	3 gals.

Will cover about 3600 sq. ft.

The oil gloss is suitable for dark colors only. If a light color is wanted use enamel. The oil used in the paint will turn yellow and spoil the color in the case of light shades.

Sizes Used with White Lead Paints on Plaster Walls.

A size serves two purposes on plaster walls when they are to be covered with paint. In the first place it will fill the small surface cracks and in the second place it will prevent an uneven appearance after painting, due to the uneven porosity of the walls. The usual practice is to put the priming coat on first. If the small cracks show through a size is put on over the priming coat. If the painter is sizing to even up the porosity, he may size on the bare plaster.

There are two kinds of sizes used commonly; the glue size and the varnish size. Varnish sizes are proprietary articles and so no directions are given for mixing them. The glue size is made as follows.

Soak a pound of sizing glue in cold water for about a day. Then pour off the cold water and dissolve it in hot water. About a gallon is required. After the mixture cools it is applied with a wide brush. Of course the size must be dry before painting over it.

Formula for Mixing Calcimines.

(From U. S. Govt. Bulletin.)

Mix 16 lbs. of whiting with a gallon of hot water, stirring until it is free from lumps.

Soak a pound of glue in a pint of cold water for about four hours and then dissolve it in the hot water bath. Add the glue to the hot whiting and after the mixture cools it may be applied to the wall. It will cover about 270 square feet.

The calcimine can be colored by adding colored pigments purchased as dry colors. The material is mixed with a little hot water and then added to the whiting solution. When using lampblack as a pigment add a little soap or borax to the water to make it possible to wet the lamp black. The following colors are good for this purpose: Yellow ochre, raw and burnt umber, raw and burnt sienna, oxide of iron red, ultramarine blue, lampblack. They can be combined to get other shades. It is always imperative that a record be kept of the amount of any coloring matter added so that the color can be duplicated in case the first batch mixed does not finish the job.

Sizing for Calcimines.

The glue size mentioned under painting can be used or the following alum soap size.

Two solutions are needed. First apply a hot soap solution made by dissolving a bar of common soap in about a gallon of hot water. When this is dry apply an alum solution made by dissolving a pound of alum in a gallon of hot water. The two form an insoluble compound which keeps stains from coming through the calcimine.

Mixing Prepared Paints.

As the directions for this vary and are always printed on the container, no directions for mixing these paints are given here. They may be considered as the most useful paints for inside work that have been developed especially for use in the home. They are cheap, come in a great variety of colors, are easily mixed and conveniently applied. The stock colors can be mixed at home to get almost any tint desired. In doing this the same caution must be observed as in mixing any other kind of paint. Keep close account of the proportions used so that duplication is possible.

Brushes for Wall Painting.

For white lead paints use a stiff brush for the first coat. For the following coats which contain little, if any, linseed oil, a softer brush is used and the color is flowed on without much brushing.

For calcimine a regular white wash brush can be used, though better quality brush will give better results.

For proprietary paints follow the directions on the package. Some manufacturers suggest the use of a good wall brush instead of a cheap whitewash brush.

Application of Paints to Walls.

1. Preparation of walls.

Cleaning.

If there is old paper on the wall, pull off all that you can, dry. Then wet the rest with a thin paste. After soaking a little the most of the paper will come off and more paste can be applied to what remains and it can be scraped off with a broad putty knife, being careful not to scratch the walls. Scrub off the old paste with warm water.

If there has been white wash on the wall scrub it off as much as possible with a wire brush then go over the walls with a scrubbing brush and water.

If the walls are clean and free from old finishing material, brush the dust and cobwebs off.

Painted walls should be scrubbed with water and soap to remove grease. A little washing soda can be used in the water.

Filling cracks.

Mix a stiff paste from plaster of paris and water in small quantities and fill the small cracks. The larger cracks should be cleaned out to the lath and then moistened with water so that the plaster will form a closer bond. After the plaster of paris is dry, sandpaper off all the ridges so that the cracks will not show up through the paint.

2. Staging.

For the ordinary home a table or a couple of step-ladders with a board from one to the other will be sufficient for a working platform.

3. Paint the ceiling and drop ceiling.

The only trouble here will be the marking of the edge of the drop ceiling. Stretch a cord from one corner to the other at the proper height and after chalking the cord, snap it. The nail holes are filled later. This joint between ceiling and walls is often hidden with a stripe of darker paint.

Paint small laps so that the edges of the first lap will not be dry before you begin the second. Paint sets rapidly on plaster and it is often difficult to work rapidly enough to keep laps from showing.

4. Size the walls if necessary in the case of white lead paints. Sizes are not much used by amateurs for calcimine or water paint but if needed follow the directions given above.

5. Paint the sidewalls.

Begin next the light and work up and down, keeping laps small enough so that they will keep moist until the next lap is started.

6. Wash the paint from woodwork and windows before it dries out.

7. Do the decorative work such as stencilling or painting of division lines between ceiling and walls.

Problems for School Work.

1. Estimate amount of paint required for white lead paint for a room of any desired size. Make a list of all the needed ingredients and their cost.

2. Estimate time required to put on the above in the light of their previous painting experience.

3. Estimate the amount of paint to get for a room in the school that the class is going to paint. Choose the color, purchase materials and apply the paint.

4. Mix small quantities of calcimine with colors, to give some experiences in the handling of dry colors and allow the pupils to try out color schemes of their own design and whose shades they have mixed themselves. This may be done on boards or a vacant wall in the shop.

Note that no practice in the use of sizes is provided for. Stencilling is not taken up either in this course but could easily be added.

Supervision.

All boys should wear overalls while working at the job. All holes must be smoothly filled.

Woodwork and windows must be left clean.

Mix only what paint will be needed for the day's work as it spoils when left standing long.

Line between ceiling and walls should be clean and sharp;

Wash brushes and dry them as soon as you are through for the day.

Whitewash.

While whitewash belongs in the group of inside finishes it is studied by itself for various reasons. Most of the following material is from government bulletins.

Whitewash is made from quicklime or calcium oxide and water. The calcium oxide takes up hydrogen and oxygen from the water, giving off a great deal of heat in the process, and becomes calcium hydroxide. It is in this form that it is applied to our walls. It is specially valuable where a disinfecting action is desirable. It kills germs and does not furnish a soil for germs to grow in. It is also very cheap and is easily applied. It may be made very durable by adding various materials that have a tendency to make a cement when used with lime or which add to its adhesiveness. Some of these materials that make a more lasting coat are salt, flour paste, milk, glue, cement, alum, soap, etc.

Quicklime is made from common limestone such as is found in large quantities in many parts of the country. It is prepared by putting it into a kiln and burning it. The carbon in the rock unites with the oxygen of the air and leaves a mineral which is previously mentioned as calcium-oxide. This is the ordinary quicklime, or as it is often called, lime. It is a white rock in appearance as almost all of us know, and when water is put on it, a great deal of heat is liberated and the rock crumbles to powder which is mixed with the water to form a white liquid or whitewash.

VOCATIONAL HIGH SCHOOL, OKMULGEE, OKLA.

The process of slaking, as the mixing of water with the lime is called, needs quite a little care. If too little water is added the lime overheats or burns and gets hard lumps in it that are hard to break up. If too much water is added the lime will be drowned and either fail to give off enough heat to make the mixture boil as it should, or else the resulting mixture will be too thin.

The following will guide the worker in slaking a batch of lime. Allow five pounds to the gallon of white wash. (No figures are on hand to tell the covering quality as this varies so much with the surface to be covered.) Place the lime in a wooden container of large size, and pour on water equal to the bulk of the lime. After the chemical action starts, which will be in a few seconds as a rule, especially if hot water is used, though it may take several hours with a poor grade of lime, stir the mass vigorously and add water as needed to keep the mixture near the boiling point. Do not add too much on account of the danger of drowning nor too little as the solution will get too hot. No precise rule can be given but all exposed parts of the lime should have access to water so that it is well to keep the mass just covered with water. If it seems to be getting too crumbly, more can be added. When the action seems to stop, no more water should be put on.

The resulting mixture can be used by itself as a white wash after thinning or other materials can be added to make it stick better. In cellars or damp places no material should be added that would have a tendency to decompose as glue or flour, though rice seems to work all right.

The well known government white wash as used many years by the Bureau of Lighthouses is made as follows:

Slake half a bushel of unslacked lime with boiling water, keeping it well covered during the process. Strain it and add a peck of salt dissolved in warm water; 3 lbs. of ground rice put in boiling water and boiled to a thin paste; half a pound of powdered Spanish whiting and a pound of clear glue dissolved in warm water; mix these well together and let the mixture stand for several days. Keep the wash thus prepared in a portable furnace and when used put it on as hot as possible, with painter's or whitewash brushes.

For making small quantities of whitewash, powdered, hydrated lime may be used; it is already slaked and needs only to be mixed with water. Air slaked lime is useless for whitewash, or for that matter, for anything else.

The whitewash may be tinted with the same materials as calcimine. Brushes must be washed out at once as the lime destroys the bristles. Whitewash is often sprayed on especially in barns and outbuildings. When using whitewash in the house cover the floor to keep from staining it. The lime is hard to get off.

Problems for Pupils in School.

Experience will be given in slaking lime and in mixing the hydrated lime with water. If possible some air-slacked lime will be introduced to show the effect of its use.

(To be continued in an early issue)

NEED SCHOOLS FOR THE TRAINING OF CRAFTSMEN.

The New York "Times", in an editorial on January 18th, points out that there is a serious lack of opportunities in the United States for the training of craftsmen in silversmithing and similar art crafts. The lack of skilled artisans is evident in practically every industry where success depends upon good design and expert craftsmanship.

The editorial points out that in a recent survey of the silver industry, made under the auspices of the National Society for Vocational Education, practically no silversmiths are being trained in this country, except as they may pick up knowledge through experience in the shops. It is feared that the industry will die out in this country unless some way is found to train expert workers in silver.

In the olden times the expert workman took young men as his assistants and taught them the secrets of his craft. With the invention of machinery, which permitted reproduction in quantity, it became necessary to establish schools in order that leaders might be trained as designers and expert craftsmen. To meet the need, France had before the war 32 industrial art schools fed from over 200 schools of design; in England there were 37 industrial art schools, and the South Kensington Museum supplied traveling exhibits to some 350 art schools and 90 county museums; while Germany was credited with 59 industrial art schools.

In the United States, it was pointed out, there has been no such response to the need for leaders in the crafts. There are only two important industrial art schools, and there is not even one leading museum, though such an institution would be of value to factories with studios far from art centers and to the smaller cities.

It is shown that even New York City has no great industrial art school. There is no institution for the training of jewelers or silversmiths, none for bookbinders, lithographers, and other workers in the graphic arts, for wood carvers and furniture makers.

Recently, there have been signs of an awakening to meet the need. The Chamber of Commerce of the State of New York has recognized the need for the training of expert designers and craftsmen, and under the auspices of its education committee, has held conferences for representatives of such industries as jewelry, silverware, silk, lace, cotton, carpets and rugs, furniture, interior decoration, lithography and wall paper. It is hoped that out of these conferences will develop an industrial arts institute that will help America to adorn and beautify that which enters into the daily life of millions.

DEAN M. SCHWEICKHARD.

Mr. Schweickhard who has served as Director of Vocational Education at Clinton, Iowa, during the past two years, has been appointed Inspector of Manual Training for high schools for the state of Minnesota. He will make his headquarters at the Department of Public Instruction, St. Paul.

Mr. Schweickhard is a graduate of the Mankato State Normal School, and of the University of Wisconsin. He has taught the Industrial Arts in Minnesota, Iowa, and previous to coming to Clinton, was assistant professor of industrial arts training at Purdue University. During the war he served as Instructor of Machine Gunnery in the School of Military Aeronautics at the University of Illinois.

PROBLEMS AND PROJECTS

The Department of Problems and Projects aims to present each month a wide variety of class and shop projects in the Industrial Arts. Successful problems are invited and will be paid for. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

Problems in benchwork, machine shop practice, turning, patternmaking, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are desired for consideration. The editors will not accept the old hackneyed problems of footstools, taborets, towel holders, etc., which have been made from time immemorial, ad nauseum.

Drawings and manuscripts should be addressed: The Editors, INDUSTRIAL-ARTS MAGAZINE, Milwaukee, Wis.

BIRCH LOG BIRD HOUSE.

H. J. Wieland.
Vocational High School, Virginia, Minn.

Birds may be gathered about us in all seasons of the year with ease and certainty, merely by offering what they desire. It may be in the form of a well constructed house made of wood, a cheese box, tin can, gourds, stove pipe, an old shoe or hat.

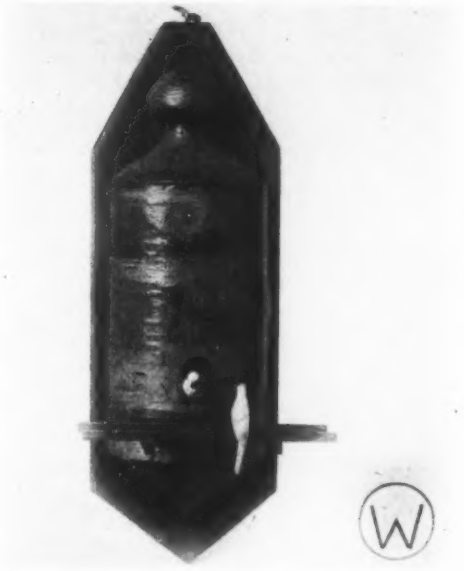
Most all bird houses are constructed by the classes taking bench work. The writer has had quite a call for bird houses from the classes taking wood turning so the above drawings were used as a class problem in the seventh grade wood turning classes.

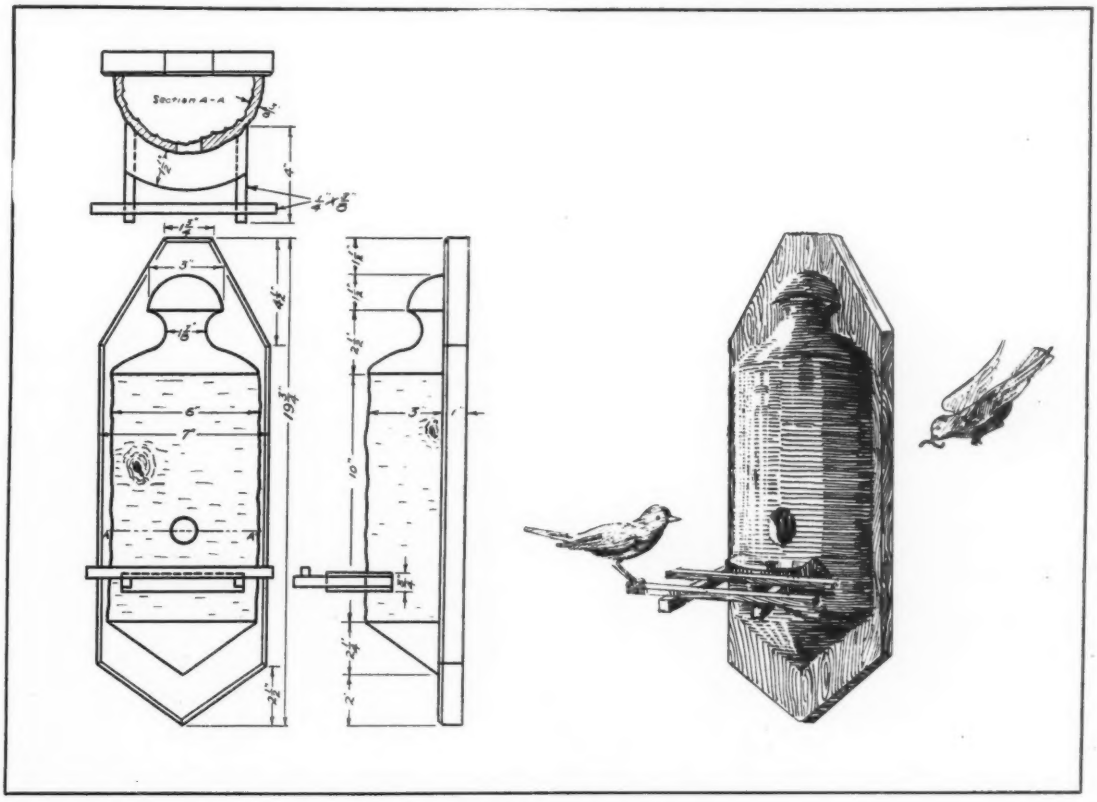
Bill of Material.

1 piece of white pine, 1″ x 7″ x 20″.
1 piece of white pine, ¾″ x 4″ x 6″.
1 piece of white pine, ¼″ x ⅜″ x 24″.
1 sound birch log about 6″ and 10″ diameter and 20″ long.

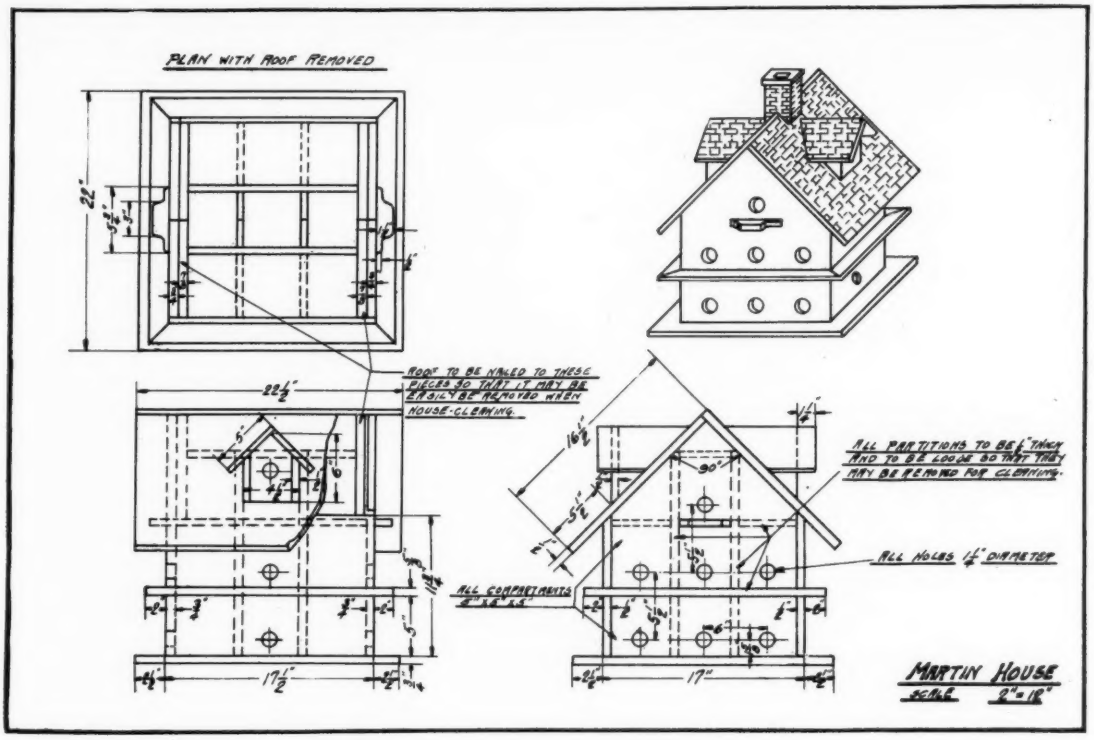
Steps for Making.

1. Place the birch log in the lathe and turn top and bottom ornament as in the drawing or other suitable design.
2. Sandpaper and apply a coat of linseed oil to all turned parts. The oil will seal up the end grain and keep it from checking.
3. Mark a center line through the stock and build a





DETAILS FOR BIRCH LOG BIRD HOUSE.


PLAN WITH ROOF REMOVED
ROOF TO BE NAILED TO THESE PIECES SO THAT IT MAY BE EASILY BE REMOVED WHEN HOUSE-CLEANING
ALL PARTITIONS TO BE ½" THICK AND TO BE LOOSE SO THAT THEY MAY BE REMOVED FOR CLEANING
ALL HOLES 1½" DIAMETER
ALL COMPARTMENTS 6" SQ. & 6"
MARTIN HOUSE
SCALE 2" = 1'

DETAILS OF MARTIN COLONY BIRD HOUSE.

small cradle for the log to rest in while it is being split. The cradle is used when using the band-saw for splitting; if done by hand, the cradle can be omitted.

4. Lay out the shape or the opening of the inside. To get the correct size of this, look up, "Farmers Bulletin No. 609 Bird Houses and How to Build Them" Under table 1, Dimensions of nesting boxes for various species of birds you will find the size of floor, also the proper size of entrance for various birds.

5. With an outside ground gouge, proceed to hollow out the inside.

Bore the entrance hole from the outside so as not to break the bark.

7. Shape back according to design.

8. A perch may be made of wood or some small limbs. If limbs are used, it will be necessary to bore a hole of the desired size, and toe nail the limb after it is in place so it will not drop off. Heads of nails should be set rather deeply and covered with putty.

In case there is danger that rain may be driven in through the door, a small drainage hole, which will be covered by the nest, may be made in the floor.

9. The back is fastened to the log by means of screws, which can be taken out every spring when the house is given a good cleaning.

10. The back can be stained green, the perch a yellow or blue, some small decorations can be placed on the log and the whole house given one or two coats of good spar varnish.

MARTIN HOUSE.

F. W. Ziegenhagen, Instructor in Woodwork, Boys' Technical High School, Milwaukee, Wis.

The time is here when we again think of bird houses. The drawing shown is a 28 compartment house, and is an interesting project for woodworkers of moderate skill.

The drawing is shown in detail, hence only a few suggestions are necessary. The bottom of the martin house may be made up of tongue and groove material, or it may be made up as a doweled and glued job. The interior bottoms which form the compartments inside should be doweled and glued joints. The sides and ends are constructed in the same manner. The roof, however, should be of tongue and groove construction in order to stand the exposure to the weather.

The partitions are so arranged that they can be removed when the house is cleaned. The divisions between the rooms or compartments are half lapped and are nailed to the floors of the various stories, so that the entire section may be taken out. In the extreme top section are additional pieces which rest on the top floor at each end and to these pieces the roof is fastened. Thus, the roof may be lifted off when the compartments are to be removed.

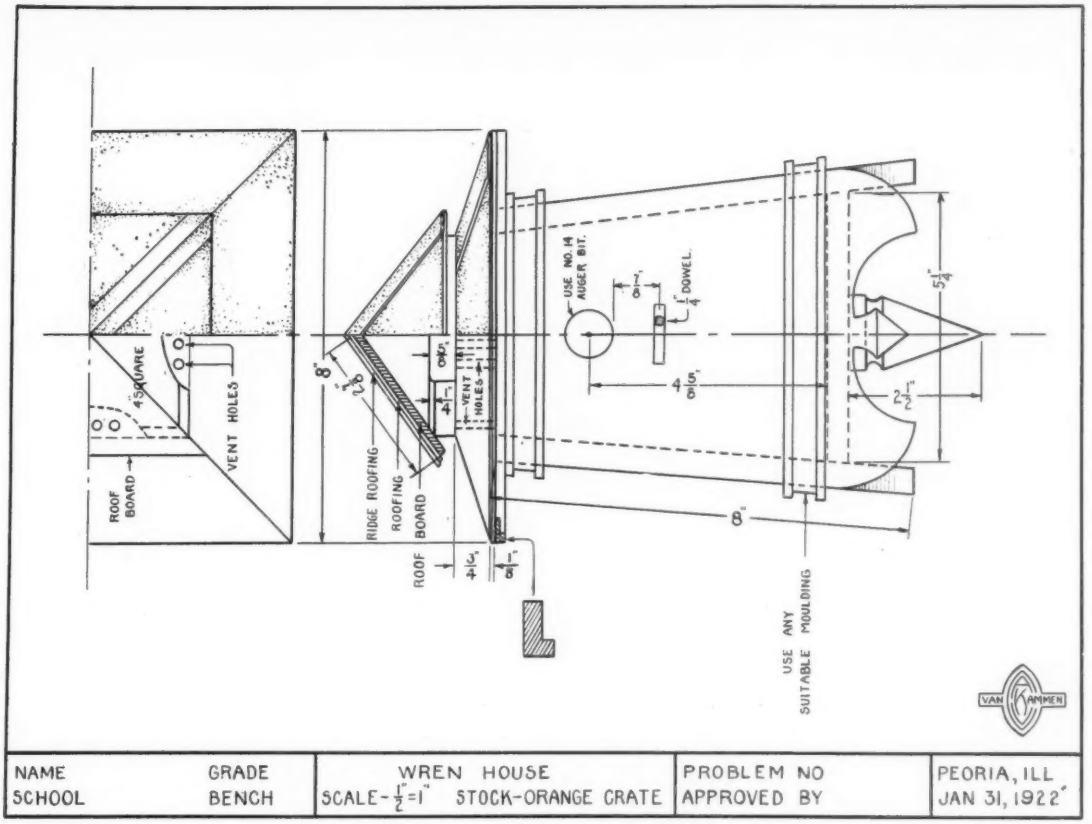
The gables are cut and assembled before they are fastened to the roof. It is suggested that a coat of pure white lead and oil be given the bird house, both inside and outside. After this is dry the house should be painted the shade desired.

THE ORANGE CRATE AND MANUAL TRAINING.

C. Anthony Van Kammer, Manual Training Department, Peoria, Ill.

If you have ever been up against the proposition of getting a sufficient amount of lumber to carry the shop-work through the school year or you have a boy who you know cannot afford to pay a very great sum of money for the stock he uses the orange crate will serve to solve your difficulties.

The type of orange crate referred to is not the rotary cut veneer variety but those that have solid ends ⅞"x11¼" x12½" and sides of 3/16"x3"x29" stock. These can be purchased for five cents and are often given gratis to the boys. There is always sufficient material in the crate to work up problems in the seventh and eighth grades. The author has worked out many excellent birdhouse designs fly traps, ringtoss games, tie racks, plant stands, toys, etc. Fly traps which cost the boys twenty-five cents to make including wire screen and paint sold for 75 cents. Ring toss games sold for 50 and 75 cents and did not cost the boy over 20 cents. Wooden embroidery hoops were used for the rings and were purchased for five cents



AN ORANGE CRATE MANUAL TRAINING PROBLEM.

in the 5 and 10 cent store. Each hoop furnished two rings. The thin stock slightly planed was excellent for coping saw work. This thin stock also served as roofs and sides for birdhouses while the ends or thicker wood was used for partitions and ends. When making the plant stands the best large pieces were used for tops. The rest was sawed into strips and used for legs and stretchers. Hot dish stands using cross lap joint were also made. Tie racks using the thick stock for backs and embroidery hoops or rings were very successful.

A WASH BOARD.

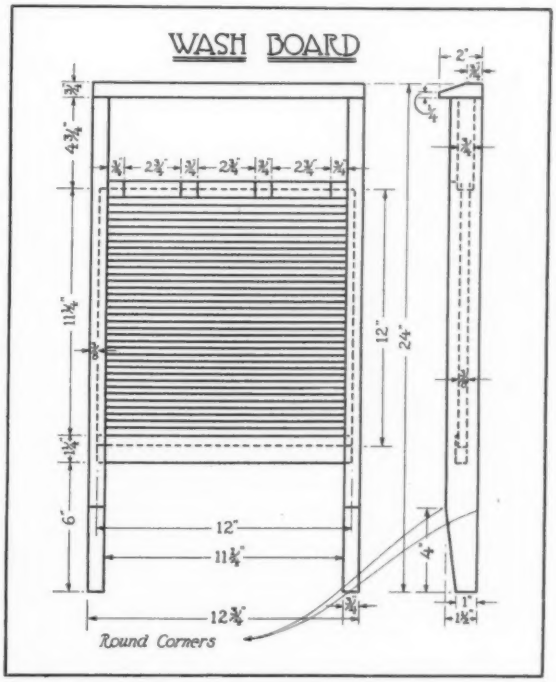
E. E. Sowers, Arcadia, Ind.

In the caption of the "Problems and Projects Department" it is requested that contributors send no problems of taborets, hall trees and similar articles. While I understand the idea implied still I am led to believe that there is a danger in getting away from practical, everyday things and putting too much stress on expensive and fine articles.

In selecting projects I believe it is necessary not only to consider educational and artistic merits of the article but also to take into account the cost of the material, the usefulness of the article produced and the contribution which the work will make toward developing the boy's vocational and general development. While one boy may have the ability to make a library table, a foot stool will be the limit of another boy's ability to design and construct a piece of furniture. Again another boy may not be beyond the ability to plan and to make so simple an article as a washboard. It is with these principles in mind that the project illustrated in this column was originated and developed and sucessfully made in the writer's classes. The bill of materials is as follows:

Material—Cottonwood.

2 pcs. ¾"x1½"x23¼"
1 pc. ¾"x1¼"x12"
1 pc. ¾"x4¾"x11¼"
1 pc. ⅜"x12"x12"
1 pc. ¾"x2"x12¾"
1 pc. ⅜"x¾"x11¼"
1 crimped zinc 12"x12"
6 6d finish nails.



TWO SEWING CABINETS.

Lee M. Klinefelter, Maury High School, Norfolk, Va.

Either of these little sewing cabinets will prove a delightful gift for the mother or big sister of the boy who makes it, as well as giving the boy a chance to combine his woodturning and cabinetmaking.

The construction is quite plainly shown in the drawings. Most of the material can be resawn from inch boards. If this is done, care should be taken to use only thoroughly kiln-dried lumber, in order to avoid warping. It is also well to finish the cabinet both inside and out for the same reason.

CABINET DESIGN NO. 1.

Mahogany and walnut are very satisfactory materials to use. The cost of materials is so small, as compared with the work involved and the results obtained, that the use of any but the best wood is poor economy.

If mahogany is used very satisfactory results are obtained by sponging with water, sanding, and staining with a brown mahogany water stain, not too strong. Follow this with dark brown or mahogany filler, one coat of orange shellac reduced one-half and two coats of good rubbing varnish, sanding after shellac and first varnish coats with 000 sandpaper or steel wool and rubbing down the last coat with pumice stone, if satin finish is desired.

If walnut is used, no stain is needed, but a very dark brown filler should be used. Small wooden knobs may be turned up, or brass or glass knobs used. The wooden ones are probably more suitable.

DON'T DESPISE AN APPRENTICESHIP.

H. E. Stone, Vocational Counselor, Erie, Pa.

"Don't despise an apprenticeship. Careers like skyscrapers are begun in the cellar." How many young men heed this wise guidance?

Ask the first young high school boy you meet what life work most interests him. Ten to one he will tell you Electrical Engineering, Mechanical Engineering banking or manufacturing. Suggest to him the value of summer experience as armature winder; invite him to try spare time work on a lathe; offer him opportunity as messenger boy in a bank; lead him into the shipping room of your factory. His face clouds. He's not interested.

Talk with him about becoming a newspaper reporter and he'll come back with dreams of becoming a "journalist." As for ordinary legal practice with its "office work," collection work, divorce cases and what not, he's not in the market. He wants to be a corporation lawyer, a patent attorney or a manager of million dollar estates at the outset. And somehow he thinks that it is largely a matter of finding the right school of journalism or the right course in law in a big university with prestige.

CABINET DESIGN NO. 2.

Were I to be asked for the most valuable general advice young men should receive on leaving high school or college I would say: "Despise not low beginnings. Be not too proud to begin in the cellar, and WORK, WORK, WORK!"

TO TAKE THE PLACE OF A CREEPER.

H. L. Goss, Vocational School, Janesville, Wis.

Get a piece of linoleum one yard wide and two yards long. Bind the ends with metal or thin wood. This will give you something to slide under the car, which I find much easier to work on than a creeper, it being slick and easy to slide around on. When soiled it is easily wiped up with a little waste and gasoline. It gives more room to work under the car also. When not in use it can be hung on the wall out of the way.

FORGING TOOLS FROM CARBON STEEL.

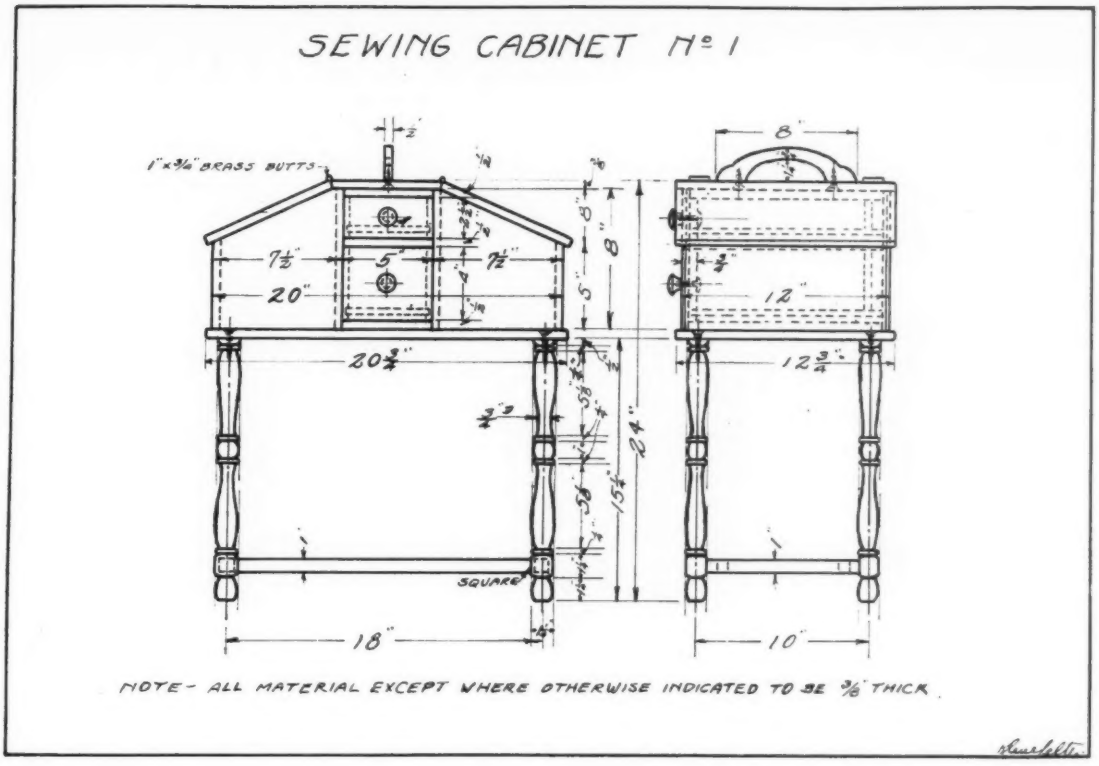
C. O. Hudson, Grand Rapids, Mich.

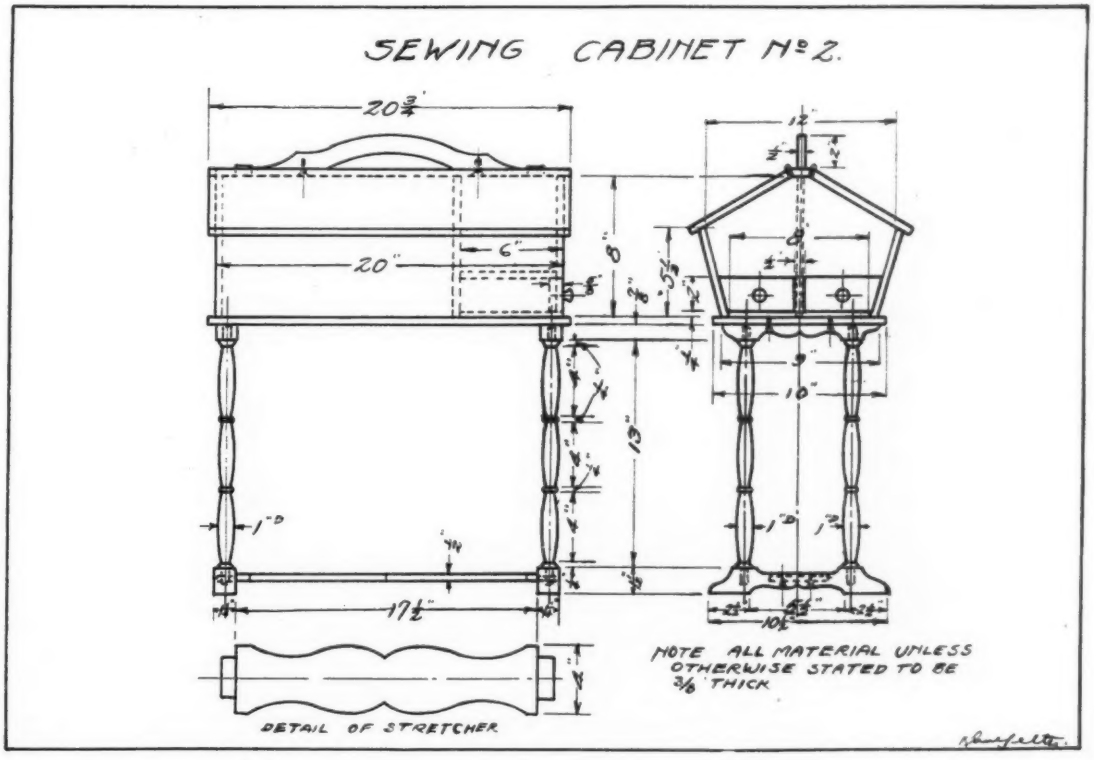
Fully as much trouble and loss are caused by improper heating in forging as in tempering. Remember this: heat for forging, bright *red;* heat for hardening, *cherry red.* Heat for tempering is determined by color, heat for annealing *full red.* A clean fire and plenty of body so the air cannot come in contact with the piece being heated.

Do not overheat a piece of carbon steel; if you do, the part overheated is ruined. Cut it off and start over again. *Do not* hurry the heat when forging; if you do, the outside will show a forging heat while the center is at a much lower temperature, and the result is the outside slides over or away from the inside when hammering and, when you harden, you will invariably find a number of semi-circular cracks across the tool and the tool is ruined.

Now we shall reverse this under heating and we say the whole piece of steel has been overheated, that is heated above the forging heat and you remove it from the forge and wait until the outside comes to the proper forging heat. In this case the result after hardening will be a seamed or cracked center.

Forging at the proper heat (*Bright Red*) giving time to heat through, there will be no cracks when hardened. the grain will be fine, the tool will be tough and will stand any reasonable test. This covers the essentials of forging.





DETAILS OF TWO SEWING CABINETS DESIGNED BY LEE. M. KLINEFELTER, NORFOLK, VA.

Now we will take up the hardening heat *cherry red.* Don't forget this: A tool must be hardened before it can be tempered, the proper way to do this, heat slowly to a *cherry red* all over and, when you feel sure it has reached this heat, dip it in clean water with the chill off. For example, we shall take a cold chisel, dip the blade down about ¾" move around in the tank so you create a wave. This prevents what is known as a water line and also brings the steel in contact with cool water. When the chisel is cooled to this point, remove from the bath and allow the moisture to dry, then brighten with sand stone the part of the blade you have hardened, and you will notice the color begin to start at the point where the hardening stopped. The first color is light straw, then dark straw, brown, purple and dark blue. This is the color you want for a cold chisel, and it should then be cooled to stop the temper from drawing too low.

FISH KITES—AFTER THE JAPANESE.

Katharine H. Scott, Normal University, Normal, Ill.

With the balmy days of early summer comes the ever alluring pastime of kite-flying for boys and girls. Kites constructed on the regular lines of the four or six sided shapes are generally used, varying in size and color; but kites of unusual design and craftsmanship are always hailed with delight by the flyers.

Here is a unique design for a kite, based on the Japanese Fish Kites so well known to oriental kiddies, which I have worked out and presented to third and fourth grade children with very pleasing results, and which has brought much enthusiasm from the little kite builders.

Crepe tissue paper may be successfully used and may be more easily found in the normal colors, tints and shades, than plain tissue although plain tissue paper makes a stronger kite.

Paste two sheets of nine by twelve inch manila paper on the short edges, lapping one-half inch. Paste a strip three by twelve inches on one end to make the manila paper measure twelve by twenty inches. From this piece of paper cut a fish shape, similar to figure one. Make mouth very wide open. With the fish pattern cut two shapes of the same tone of tissue paper and paste the sides of the shapes together leaving the edge of mouth open and unpasted. The pasted edges must extend only one-half inch from the outer edge of shape. This leaves the sides of the fish free to be inflated with air when flying.

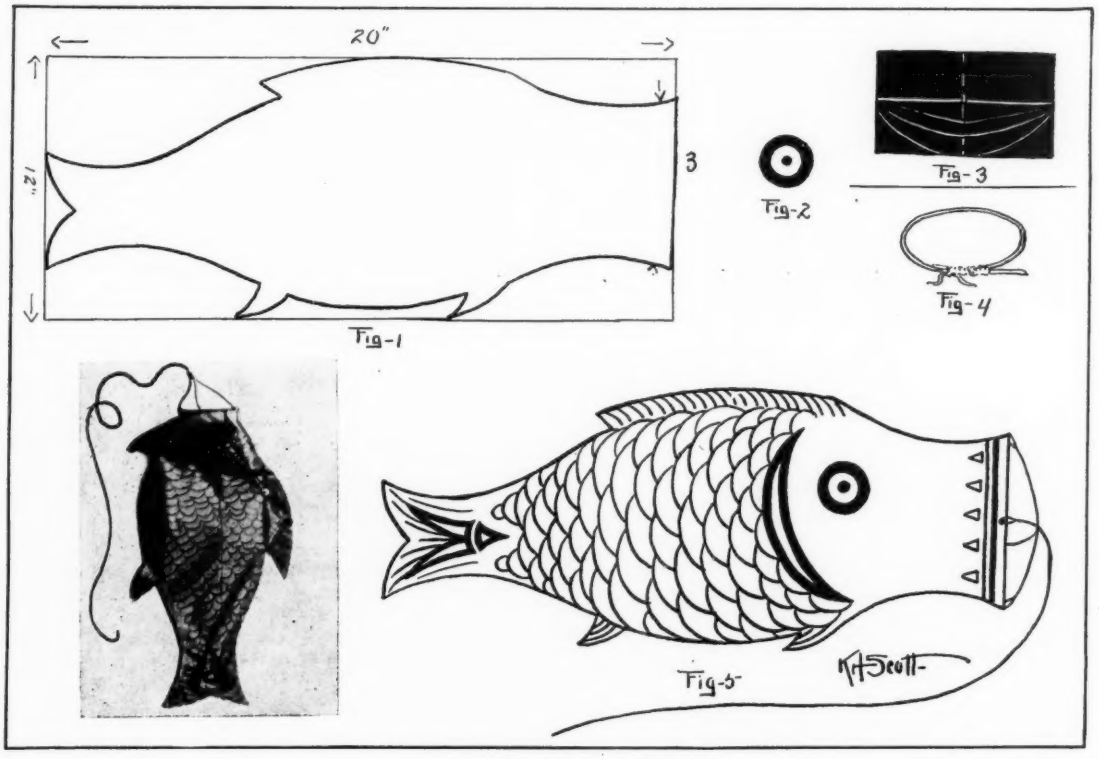
Cut a piece of No. 1 reed twelve inches long, soak it in luke warm water till soft and shape into an oval, tying the ends with a piece of stout cord or thread, so that the reed may be slipped to shorten or lengthen the oval. Fig. 4.

From black paper cut two shapes for the fills, the eyes and for the spot on the tail of fish. Cut smaller shapes of colored tissue paper similar to the black shapes and mount on the black paper pasting shapes in place on the fish. Figures 2 and 3. Use complementary colors for decoration. Draw scales and lines on the body, tail and fins and paste the edges of the opening of the mouth over the reed oval. In three places indicate by Fig. 5, thread string, bringing the ends together and tying in the center. To this attach the flying cord and try out the sailing properties of the kite. The fish will not fly high but will willingly follow the children as they run.

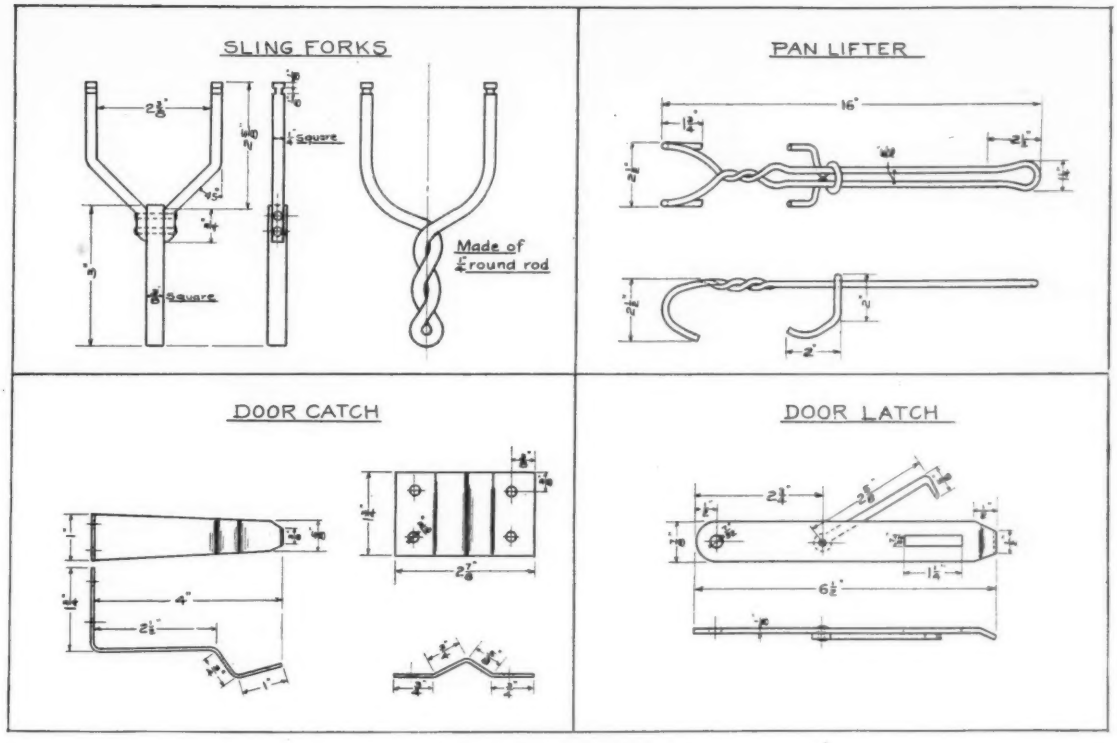
FOUR METAL WORKING PROBLEMS.

Eber L. Moore, Connersville, Ind.

The four problems illustrated have been worked out under school conditions and represent typical interest which the school can reach. The Sling Forks are of interest to any country boy, the Pan Lifter is of use in any kitchen, the Door Catch is suitable for the garage or barn door, and the Door Latch can be applied to any garage or woodshed, or any other outbuilding.



A JAPANESE FISH KITE.



FOUR METAL PROBLEMS.

The Sling Forks.

Two types of sling forks are shown in the drawing. The one made from round rod ¼″ in diameter, is very easily made. After cutting the material to the desired lengths, and filing the notches in the ends, bend the rod in the middle until the two halves are parallel. Place the curved end in the jaws of the vise and by means of a hand clamp or monkey wrench, twist the handle to the proper length. Next shape the arms by means of the anvil and hammer.

The second fork is a simple construction problem involving riveting. We may also introduce some metal polishing and finishing, making it a very attractive problem.

The Pan Lifter.

The pan lifter is made from ¼″ iron rod. In constructing it, first cut a piece 36″ long and find the middle, then bend the end of the handle to dimensions, making the two parts parallel. Next place a small block of wood in the part you have shaped and place the two bended parts in the jaws of the vise and press together until there is 5/16″ between the two parts and they are still parallel. A piece of wood 5/16″ thick placed between them will aid in getting them straight. Shift the parts in the vise to the point where the twisted part is to begin, and tighten the jaws, and with wrench or pliers twist the two and shape the remaining part to dimension.

The slide should be shaped around the handle. The loop should be large enough to permit the slide to move freely.

The Door Catch.

The door catch to be used to hold doors open, is made from spring steel and sheet iron 1/16″ thick. It is cut from the sheet by means of a hack saw. The bending should be done cold. By placing the parts to be bended in the vise and using hammer, they can be made the desired shape.

The holes should be laid out accurately and drilled after bending.

The Door Latch.

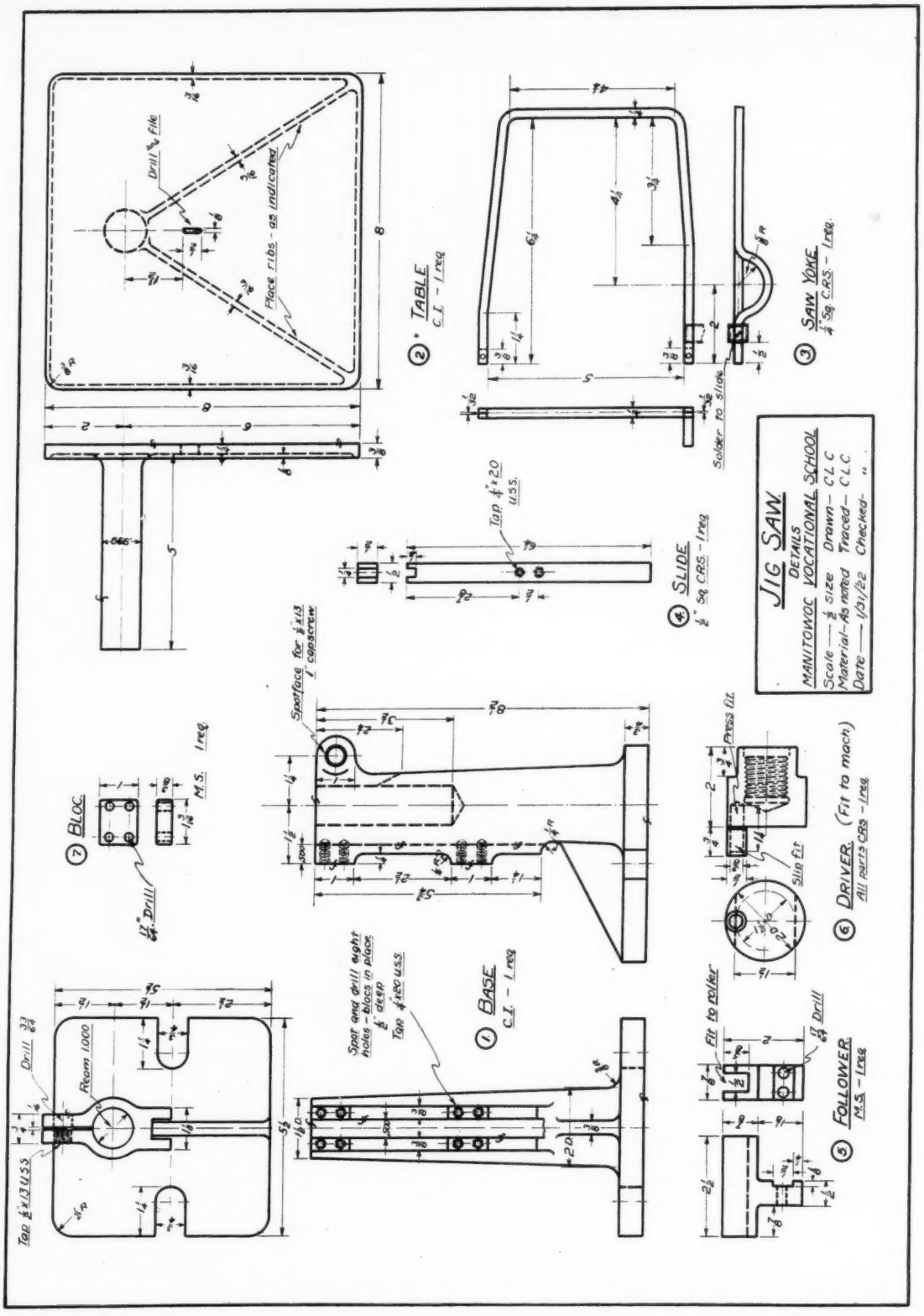
The door latch is made in two parts, the body and the hook. The body is made from a piece of strap iron ⅛″ x ⅞″ x 6½″. One end is rounded by grinding or filing and a 7/32″ hole is drilled at the center of the circular end. The other end has the corners filed off. The rectangular hole is made by boring a series of 7/32″ holes. It is filed square with a flat file. The hook is made from a ¼″ square iron rod. The end that is hinged to the body is forged flat and filed circular. The hook is riveted to the body. Finally the problem should be polished and finished.

A JIG SAW.

C. L. Conroy, Manitowoc, Wis.

A jig saw is a machine seldom found in school woodworking and pattern making departments and yet proves a valuable asset when need arises; in fact it is practically essential for some classes of small work. If desired one can be made that will prove satisfactory both in operation and from the standpoint of a suitable project for pattern and machine shop work.

The accompanying drawing illustrates a jig saw; which we drew up to run as a lathe attachment for the pattern making department, being clamped down on the lathe bed near the headstock and being driven directly by an eccentric roller on a driver, which screws on the lathe spindle. This driver has two flat milled surfaced on the back to enable it to be readily removed, and the roller is placed away from center according to the stroke desired, in this machine it being a 1¼″ stroke. The follower is milled out of a machine steel block as indicated and presents no difficult operation, being simple milling, shaping, and drilling. The width of the roller slot must be held close, however, to allow the roller to roll freely and yet not so loose as to cause the machine to become noisy. When a roller wears down to the extent that it has slack and causes a noisy vibration, then a new roller can be easily made to prevent this. If the first fit is made properly, however, it will last a long time. The follower can be altered a little in design to fit a lathe


JIG SAW
DETAILS
MANITOWOC VOCATIONAL SCHOOL
Scale — ½ size Drawn — C.L.C.
Material — As noted Traced — C.L.C.
Date — 1/31/22 Checked — "
① BASE C.I. - 1 req
② TABLE C.I. - 1 req
③ SAW YOKE ¼" Sq. C.R.S. - 1 req.
④ SLIDE ½" Sq. C.R.S. - 1 req
⑤ FOLLOWER M.S. - 1 req
⑥ DRIVER. (Fit to mach.) All parts C.R.S. - 1 req
⑦ BLOC. M.S. 1 req
Drill & File
Place ribs - as indicated
Tap ¼"x13 U.S.S.
Tap ¼"-20 U.S.S.
Solder to slide
Spot and drill eight holes - Blocs in place ⅛" deep
Spotface for ½"x13 F. countersink
Ream 1000
Drill 33/64
Drill ½"
Drill ¼"
Press fit
Slide fit
Fit to taper

DETAILS OF A JIG SAW.

having higher or lower centers. The slide and saw yoke are made from standard cold rolled bar stock as indicated and require very little machining. The yoke is bent as shown when compressed to receive saw, but without saw clamped in place should have about a 6″ opening, thereby giving proper tension to the saw blade when inserted and fastened. The yoke is soldered or brazed in place to the slide, care being taken to not bend or mar the slide, which must be a close sliding fit in the slide groove of the base.

The two blocks required to keep the slide in place are drilled in place on their pads, and letting the 17/64″ drill spot the pads which are tapped ¼″ x 20 U. S. S. to receive fillister head cap screws ¾″ long. The table is made of cast iron, being made from a flat back pattern simple to make and mould. The base is also of cast iron, being moulded from a split pattern. The groove can be left in solid and shaped out later on, thus eliminating the use of a core. The machine work on both table and base are simple and yet demand a certain amount of accuracy.

This little machine it will be seen is simple in construction, easily built by students and one which will give excellent service in a woodworking department where small work is handled or where a regular band saw would be unfitted. The speed can be varied by shifting the belt on the cone pulley of the lathe. Owing to the fact that small jig saw blades come in several types, the writer has left the method of fastening to fit requirements, in this case using a 5½″ straight end and holding in place in a 1/32″ slot and clamped with a small bolt and nut.

STORAGE BATTERY CHARGING SET.

Geo. H. Wichman, Coleraine, Minn.

The charging of a storage battery offers a project that is highly instructive, intensely practical and much to the interest and liking of the students. It requires a knowledge of some simple electrical theory, demands some constructive wiring and gives any amount of practice and experience in working with batteries. The project may be carried out entirely aside from an electrical course, the only requirement being that direct current power is available.

The principle of charging a storage battery depends on sending a reverse current through the battery cells thus reversing the internal chemical action. The amount of this charging current is usually found on plate tacked to the battery.

In general there are three methods of charging a battery. The first method makes use of alternating current power which is stepped down to a lower voltage by means of a transformer and is sent through a "commercial rectifier" which converts the alternating current into a rectified current. This rectified current has the same effects in charging a battery as direct current. The second method uses a motor generator set for developing the low charging voltage. Both of these methods require more or less expensive equipment.

The third method and the one described here makes use of 110 volt direct current. The effective charging voltage is secured by the use of a bank of lamps connected in parallel. By turning on the required number of lamps any charging current may be secured, the effective charging voltage being automatically taken

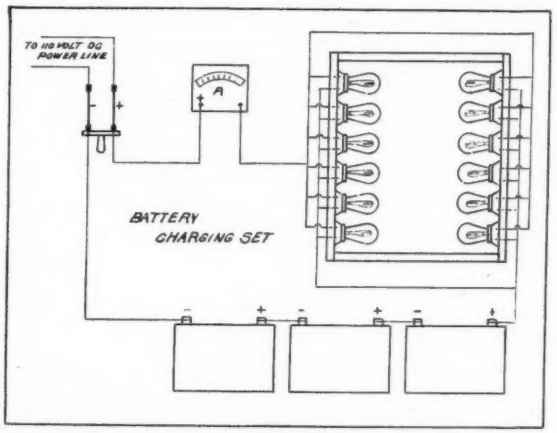
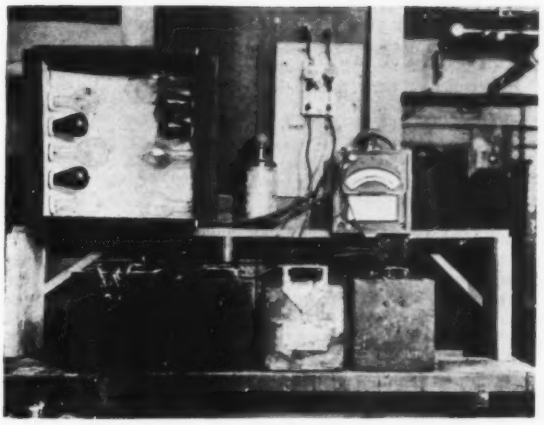


DIAGRAM OF THE BATTERY CHARGING OUTFIT.



CHARGING BATTERIES IN A SCHOOL SHOP.

care of. The ammeter shown in the drawing is a convenience, though not a necessity. Since the internal resistance of a storage battery is very low, the current in the circuit is practically dependent on the resistance of the lamp bank. Thus if 100 watt lamps are used about 1 amp, per lamp will flow in the circuit. If a charging rate of six amps. is wanted six lamps will practically give the required current. In making the proper connections as shown in drawing it is necessary to determine the polarity of both battery and power line. The terminals of the storage battery are usually marked. In case there in any doubt about the polarity, connect wires to both terminals and insert the ends in salt water. Bubbles will be seen to rise from the negative terminal. The same method may be used in determining the polarity of the power line. In this case however a lamp should be connected in series with the power. The polarity may also be determined by an ammeter. For protection and convenience the whole apparatus should be wired through a fuse block and a knife switch.

Before commencing to charge it is necessary to determine the condition of the various cells by means of a hydrometer. Each cell should be tested individually and the specific gravities recorded for later comparison. Each cell should then be filled to proper level with distilled water. Readings from 1.280 to 1.300 indicate a full charge; 1.260, three-fourths charge: 1.229, half charge; 1.160, one fourth charge; and 1.150, empty. The batteries having been properly connected, turn on the power and charge for five hours. A second set of hydrometer readings should be taken and should show an increase over the previous readings. If this is the case continue charging until the cells are fully charged. After being fully charged it is well to let the batteries stand for 24 hours. If the hydrometer still indicates a full charge the battery is ready to be returned to the car.

In case the cells refuse to build up apply a small charging current until the cells show signs of building up. At this stage a full charging current may be applied. In case a cell refuses to build up or refuses to stay charged indications are that an internal short exists. In this case it is advisable to send the battery to a service station unless one has had considerable battery experience.

While this method of charging seems wasteful and is not used commercially, the cost of charging a number of batteries simultaneously is relatively small. By this method sixteen 6 volt batteries may be charged as cheaply as one. Many batteries have been charged in the author's shop with uniformly good results. However, it must be remembered that the value of this project does not lie in the charged battery but in the fact that the boys have secured a much better understanding of the construction, use and care of this vital center of the modern automobile.

MONTHLY MEETING OF BOSTON VOCATIONAL SOCIETY.

The regular meeting of the Vocational Education Society of Boston was held during the early part of March, at the Hotel Avery, Boston. Pres. Geo. F. Hatch presided at the sessions.

Following the luncheon, Mr. Arthur L. Gould, assistant superintendent of the Boston schools, gave a very interesting and entertaining talk on the scope of the National Education Association meeting at Chicago. In his summary, Mr. Gould declared that Professor Inglis of Harvard, spoke in opposition to a federal subsidy for education. He did not approve of national control of education, believing that the control of the money appropriated for educational purposes, and the control of educational policies, should be vested in the local state and municipal educational officials. Prof. Geo. D. Strayer, of Columbia University, spoke in support of the Sterling-Towner bill, pointing out the advantages which would accrue from the centralized control and direction of educational policies of the United States. Dr. Capen told of the value and advantages derived from and methods of conducting a national education investigation. Commissioner John J. Tigert, at the convention, gave some interesting facts relative to the extent of illiteracy in the United States.

Mr. Gould also spoke of a visit to the public schools of Winnetka, Ill., outlining in detail, the scheme of Mr. Washburne, the superintendent of schools. He selected an extract from a printed goal-book, a book covering the year's work in a practical subject. From an educational standpoint, Mr. Gould's talk was a masterly presentation of the latest developments in the educational field as gleaned from his summary of the speeches at the convention.

At the close of the meeting, it was voted to accept the invitation of Director Arthur Williston, of Wentworth Institute, to hold the April meeting at Wentworth, at which the Manual Arts Club will also be invited. President Hatch requested a large attendance at the April meeting, as a mark of appreciation to Professor Williston in throwing open his school to the Society.

P. J. Smith.

ANTHRACITE ARTS' ASSOCIATION.

The Anthracite Arts' Association which is made up of teachers of art, industrial education, home economics, agriculture, continuation classes, commercial work, music, penmanship and physical education in cities and counties of northeastern Pennsylvania, held its annual meeting February 20th, at Scranton, Pa. Over 300 members were in attendance at the meeting.

The association voted to hold the 1923 meeting in Bethlehem and the officers have indicated a desire to make this the best convention yet held. The convention city has a good reputation for its progressive educational program and for its school buildings and should attract a large delegation of visitors.

At the business session, Mr. James C. Tucker, Director of Vocational Education at Bethlehem, was elected president, and Miss Gertrude O. L. Dustin, Director of Home Economics of Bethlehem, was elected secretary-treasurer. The former is also president of the Pennsylvania Society for Vocational Education.

MAINE VOCATIONAL SOCIETY MEETING.

The spring meeting of the Maine Vocational Society will be held April 20th, in the Portland High School, Portland, Me. Mr. H. G. Noyes, Rumford, will preside.

The speakers who are to be at Portland are of national importance. Mr. L. A. Wilson, director of vocational education of New York, will be one of the speakers. Mr. C. E. Lawrence, Scranton, Pa., has had 25 years' experience with adult education and was one of the organizers of the Marine Corps Institute. Mr. M. S. Herbert, director of vocational education for Holyoke, has been successfnl in promoting vocational education in Holyoke. Prof. Ernest P. Groves, Boston University, is an authority on rural sociology.

Mr. Ernest Curley, Rumford, will act as chairman of the industrial section, Mr. C. L. Stephenson, Farmington, of the agricultural section, Mr. C. P. Harrington, Dexter, of the trades and industries, Mr. M. S. Coombs, Rumford, of the home economics section. Mr. M. S. Hill, of the social service section, Mr. Alden B. Hayes, Bangor, of the vocational section.

SCHOOL CRAFTS CLUB MEETING.

The regular meeting of the School Crafts Club of New York City was held in the Stratford House, on Saturday evening, March 18th.

The meeting took the form of two round-table groups, the first of which was supplementary to the January one held in Newark, when the attendance prevented the usual close contact. Mr. Edwin F. Judd, of Upper Montclair, N. J., held the attention of this group by his very able talk on "The Radiophone as a Shop Project." Mr. Judd has made a deep study of this subject therefore he speaks with considerable experience.

The second group took up the subject of supervision. The leaders of the table were Dr. E. B. Kent, Director of Manual Arts, Jersey City, N. J., Mr. A. W. Garritt, Director of Shopwork for New York City, and Mr. John Hatch, State Normal School, Newark, N. J. Among the topics discussed were: "What the Teacher Expects," and "What the Supervisor Looks For."

The club received a number of new applications for memberships.

R. F. Hemion.

OSWEGO DISTRICT VOCATIONAL CONFERENCE.

The Oswego District Vocational Club held a conference on March 10th, at the State Normal and Training School, Oswego, N. Y. Mr. Wm. E. Hewitt, Watertown, acted as chairman of the sessions.

At the morning sessions the subjects of industrial arts and home making were the topics of discussion. Dr. Richard K. Piez, of the Oswego Normal School, talked on "Art as a Phase of Industrial Arts"; Mr. Arthur I. Brock, also of the Normal School, discussed "Science as a Phase of Industrial Arts"; Miss Lucy S. Norton, of the Normal School, took for her subject "Economics as a Phase of Industrial Arts"; Mr. Leon L. Winslow, of the State Education Department, Albany, described "The Industrial Arts Point of View"; Mr. Joseph J. Endres, of the Bureau of Rehabilitation, Syracuse, took the topic "Industrial Arts and the Training of Handicapped Persons in Industry," and Miss Emma Conley, of the State Education Department, described "The Improvement of Instruction in Home Making Education."

At the afternoon sessions the subjects of vocational guidance, agricultural education, training for the industry, and part-time or continuation schools were discussed. Supt. Geo. H. Bodley, Fulton, discussed "Vocational Guidance and Follow-up Work'"; Mr. Roy S. Lockwood, Hannibal, described "The Project Method in Agricultural Education"; Mr. Benjamin W. Dow, Oswego, talked on "Scientific Management and the Training of Workers," and Mr. Frank S. Tisdale, Watertown, took for his subject "The National Movement for Part-time or Continuation Schools."

At the general meeting devoted to part-time or continuation schools, Mr. Frederick Leighton, of Oswego, acted as chairman. Miss Emma Conley, of the State Education Department, discussed "The Place and Contribution of Home Making Education in a System of Compulsory Part-Time Schools"; Mr. Ned H. Dearborn, of the Oswego Normal School, described "The Special Problems of Teaching in the Part-Time School"; Mr. Donald M. Kidd, Syracuse, talked on "Records in a Part-Time School," and Mr. R. H. Rodgers, of the State Education Department, took for his subject, "Occupational Analysis and the Organization of Instruction in Part-Time Schools."

A. F. Hopper Elected President. The New Jersey Vocational and Arts Association held its annual meeting in Central High School, Newark on March 24-25.

Among the speakers were Dr. David B. Corson, superintendent of schools, Newark; W. A. O'Leary, assistant commissioner of education for New Jersey; Dr. Fred S. Shepherd, superintendent of schools, Passaic; E. Allen Smith, Newark.

The following officers were elected at the business meeting following the convention: President, Arthur F. Hopper, director of manual and fine arts, Plainfield; Vice President, Miss Mabel Gaston, Montclair; secretary, Miss Bertha Snediker, Highland Park Schools; treasurer, Mr. Philip Wagner, Newark Public Schools.

The convention was well attended, about three hundred members being present from various parts of the State. A supervisors' conference was held Friday afternoon, which was followed by a dinner. Saturday was devoted to sectional meetings.

NEW BOOKS.

Success Through Vocational Guidance.

By James McKinney and A. M. Simons, Cloth, 270 pages, illustrated. American School, Chicago, Ill.

Here is an attractive title and a good book. Vocational guidance can mean but little unless it recognizes to the full not only the capacity and adaptability of the individual to be guided, but also considers the opportunities that may be open to him.

The book proceeds upon the idea that "the choice of a life work is the most important choice we ever make," and then discusses an inventory of personal assets and an enumeration of vocational occupations.

The value of the text is centered in the thorough occupational analysis which it makes, thus enabling the student, and those who undertake to guide him, to find an adjustment between his inclination, or natural bent, and the several fields of activity. The author discusses the various occupations found in commerce, manufacture, agriculture, finance, and transportation; also professional, public and social service.

The book is merely an incident to the real service which the publishers, the American School, render to individuals who desire to find their vocation in life. A personal analysis blank accompanies the book which, when filled out, enables the authors to suggest a vocation and the preparations that shall be taken to that end.

This strikes us as a form of service that is extremely valuable in that it may direct thousands of young men into channels of activity for which they are well fitted, or can be fitted, and in which success may be attained.

Mine Management.

By Robert Z. Virgin. Cloth, 109 pages. Price $2.00. D. Van Nostrand Co., New York.

The author was prompted to prepare a tertbook on coal mining because the literature on the subject is extremely meagre. He does not deal with the mechanical processes but rather in a careful analysis of the administrative phases of mine operation. In fact the book defines the various relations between miner and manager and consumer. The several phases which enter into the building of a mine organization essential towards attaining harmony and efficiency are well treated. The economic considerations involved in a coal mining enterprise are clearly explained.

Textbook of Printing Occupations.

By C. W. Hague. Crown, octavo, 8 mo, 241 pages. Price $1, net. The Bruce Publishing Co., Milwaukee, Wis.

This book has been developed to meet the needs of vocational and secondary schools where printing is taught as a vocational or prevocational subject, and where a well defined course leading to practical work is offered. The author has analyzed the operations of printing along the latest trade analysis lines and has developed his text so as to present the facts and practices of the trade in blocks, based on typical groups of operations. The major divisions of composition, makeup and presswork are treated as complete units, more or less independent but closely related to each other.

Primarily with the presentation of facts and practices of the trade are groups of projects especially designed for their intrinsic interest, for their practical development of skill in operations, and for their progressive difficulty. These projects may be followed directly from the text.

The author has displayed an intimate understanding of the ability of the average beginner in the school print shop and has not forgotten the average instructional ability of the typical school printing teacher. The examples of typography are interesting, typical of the average jobs which can be done in the shops, and well within the range of the average boy and of the average school shop equipment.

Practical Electrical Engineering.

By Harry G. Cisin. Cloth, 324 pages. Price, $2. D. Van Nostrand Co., New York.

This introductory text leads the student from the fundamental definition of electricity and very simple explanations of the basic principles and laws of electricity in motion to a consideration of the theory and mathematics of direct current electrical engineering. The book is intended for boys in elementary, technical and evening schools and for practical electricians who desire to add to their fund of experience and knowledge, gained "on the job," an understanding of university applied theory. With his audience in mind, the author has made every point exceedingly clear and complete and has used technical language in a simple, untechnical way. He has entirely omitted algebraic and geometric symbols and has clung to arithmetical terminology and methods.

The book very logically begins with fundamental laws, then describes currents and electrical instruments. Direct-current measurments are then taken up. Complete information on primary and storage cells follows. The final chapters handle in detail generators and motors. Nowhere are constructional details of electrical devices discussed—the book limits itself to elementary engineering facts.

An appendix presents twenty laboratory experiments as means of exemplifying the theory and testing of the student's understanding.

School Shop Installation and Maintenance.

By L. S. Greene. Cloth, 100 pages. The Manual Arts Press, Peoria, Ill.

This book fills a decided need. In terse, simple language, it tells of the fundamental facts of power transmission and machinery equipment and outlines the correct methods of caring for metal and woodworking machinery and tools. The experienced engineer and factory superintendent may find the book too elementary and limiting in its scope, but for the young teacher of manual training, it contains exactly the information that is needed for placing machines, selecting and connecting motors, fitting edge tools, handling belting, replacing bearings and adjusting for wear. The book is fully illustrated and contains sufficient reference tables to make it exceedingly useful.

Furniture Weaving Projects.

By Lloyd F. Hyatt, Instructor, Advanced Cabinet Work and Furniture Weaving, McKinley High School, Canton, Ohio. Cloth bound, 140 pages. Published by the Bruce Publishing Company, Milwaukee, Wisconsin.

This book is the result of a demand for instructive material on furniture weaving, which the author, by virtue of his knowledge in this branch of industry and his experience as an instructor, was well able to provide.

The work is divided into five parts, the first dealing with the materials employed in the industry such as reed, willow and fibrecord, describing their origin and preparation for use. Part II treats the finishing of woven furniture, the necessary equipment and preparation of material, and standard furniture weaves. A series of simple projects, including taborets, flower boxes, waste paper baskets, fernery, sewing stands, etc., etc., are dealt with in Part III.

The projects become more extended in useful and ornamental designs in Part IV and include such things as book and magazine racks, wood baskets and foot stools, bird cages and standards, round and square table lamps and floor lamps. Part V is devoted to chairs, rockers and the chaise lounge. There are general utility chairs, child's sewing and arm chairs.

The book is liberally illustrated, showing not only the finished product in half tone plates, but also demonstrating the various processes of production. The author makes clear that at a small cost any school or home may equip a room for a branch of handwork which is most fascinating and practical. He has made a valuable contribution to the literature on industrial education.

Physical and Vocational Rehabilitation of Men and Women in Industry under the Workmen's Compensation Law in Oregon. Published by the State Industrial Accident Commission under the direction of Mr. Frank H. Shepherd, director of rehabilitation. The pamphlet gives conclusive evidence that gratifying results have been obtained in the past two years in the work of rebuilding men and women who have been injured in industrial accidents. It appears there are two angles to this work. One is the physical reconstruction of the injured and the other is the vocational retraining of those who are prevented from returning to the old employment. As a result of the efforts of the rehabilitation department, the injured have been restored to health and usefulness, the number of serious cripples has been materially reduced, and an important financial saving is being made to the state industrial accident fund.

NOW, ARE THERE ANY QUESTIONS?

This department is intended for subscribers who have problems which trouble them. The editors will reply to questions, which they feel they can answer, and to other questions they will obtain replies from competent authorities. Letters must invariably be signed with full name of inquirer. All questions are numbered in the order of their receipt. If an answer is desired by mail, a stamped envelope should be enclosed. The privilege of printing any reply is reserved. Address, Industrial-Arts Magazine, Milwaukee, Wis.

Parchment Shades.

295. Q: Our art and manual training instructors wish to secure the formula for making parchment transparent for use in making lamp shades. Will you kindly refer me to some one who can furnish us the formula?—W. D. B.

A: No formula is necessary for producing the translucent effect in lampshades. If shades are decorated with water color, allow the designs to dry and then apply boiled linseed oil to both sides of the paper with a sponge or light brush. Wipe off all surplus oil after fifteen minutes and dry the shade 24 hours before handling further. Oil paints used for decoration should be applied 24 hours after the linseed oil has been put on. The paper used must be of high quality. A drawing paper like Dietzgen White Detail Drawing is best.

Glue Problems.

274. Q:—Is Gloucester Best Glue as good as Peter Cooper's which you mention in one of your numbers?

2. We have an advance Electric Glue Pot. In Question No. 218, which you answered, relative to treating glue for moisture resistance, you wrote that one should avoid contact with dry heat and with the glue pot. Does this mean that our heater should not be used with this method of gluing? Just why should the precaution be taken?

3. After leaving cedar for some time, it loses its color. Can you recommend something which will restore this color before varnishing? Why is there this change?

4. How would you bend rockers to be used for rocking chairs? How would you bend the vertical pieces for the back of a rocking chair?—J. A. A.

A:—Gloucester Best Glue is a grade and brand unknown to me at this time. If you will let me have the manufacturer's name and address, I will give you a rating on this stock as compared to Peter Cooper's cabinetmaker's glue.

2. Your Advance Electric Glue Pot is a satisfactory piece of apparatus for glue work, since the maximum heat possible is not sufficient to cause the burning of the glue. It is necessary to avoid the use of dry heat, as it is termed, in digesting glue in order that it may not be scorched, hence most digesters or glue cookers are built on the "double boiler" idea, in which the inner pot containing the glue is immersed in boiling water. So long as the water level is maintained, the glue cannot be burnt, although a high grade of 50c glue can rapidly be reduced in tensile and shear strength to a point equal to that of a 10c grade, if the temperature is maintained at boiling for any considerable length of time. It is always best to make up a fresh small quantity of glue stock, heat rapidly and after using the required amount, chill the remainder. It should never be left at a low temperature for any length of time merely to keep it warm on the chance of its being used.

3. Many woods after being planed and sandpapered will change in color if left without shellac or other finish This is especially true of cedar and to some extent is due to the loss of natural oils which give it its odor. Other changes of a highly technical nature are responsible for the same reason, that newspaper stock when exposed to the air, rapidly changes in color. It is best, of course, in the case of cedar to complete all assembly work and then give the piece an entire fresh sanding, just before coating with a size of reduced white shellac, which will prevent any further change in the color. The use of varnish directly on the wood, will cause it to darken considerably in time, due to the absorption of oil from the varnish. Where sanding and fresh scraping are not practical, the color may be restored to a considerable extent by washing over with a mixture of two-thirds denatured alcohol and one-third turpentine. This should be allowed to dry five hours and then given the shellac treatment.

4. Chair rockers of the bent pattern may be made in one of two ways of which the first is to band saw out the form from 3″x6″ hard wood as beech, birch or maple and to build up the rocker itself from as many layers of quarter inch stock as may be necessary to give the required thickness. After gluing and clamping the stock in the forms it should be left in that way in a warm, dry place, to thoroughly season and harden. The same method can apply to the vertical back spindles of the chair, although they need not be made of ply wood but can be bent in the form after thoroughly steaming in a small box. In the factory, this work is done quickly and thoroughly by placing the stock in a steam retort, heating it under pressure and after removing from the retort, the stocks are put into the steam-heated forming presses and thoroughly dried out, whereupon the spindles, slats and back rails constantly retain their various shapes.—**Ralph G. Waring.**

Waterproof Drawings and Blue Prints.

287. Q:—How can I prevent blueprints from being damaged by water?—W. B.

A:—A simple method of waterproofing drawings, blue prints, etc., described by Mr. F. A. McLean, in the American Machinist, consists in saturating the prints with "para-wax," a melted paraffine wax such as is used for sealing fruit jars. Mr. McLean states that if the prints are placed directly into a pan filled with this molten wax they will soak up too much of it and will always feel more or less greasy to the touch. The most convenient way, therefore, is to soak a number of pieces of absorbent cotton cloth a foot or more square in the wax. When these pieces of cloth are cool lay as many as are required (depending on the size of the blueprint) on a table or other smooth surface, place the print on top of these and then on top of the print lay more of the cloths until it is entirely covered. After this is done it is only necessary to run a hot iron over them for a few moments. The print will immediately absorb the paraffine until the surface becomes saturated. If the table on which the work is carried out has a highly finished surface a layer or two of heavy wrapping paper should be placed between the cloths and the table. Should one of the family irons be used in the process it would be a good plan to interpose a piece of wrapping paper between the iron and the cloth, as it will prevent the iron from being fouled with the wax.

EDUCATIONAL TESTS.

299. Q:—In our last issue of the Magazine, there is an article on Vocational Guidance, and on page 135 there is a list of tests given in the various schools. I would be very grateful to you if you would send me the address of the concern which puts out these tests.—E. A. W.

A:—"Otis Group Intelligence Scale and General Intelligence Examination"—World Book Co., Yonkers, N. Y., and Chicago.

"Binet-Simon Intelligence Test"—Warwick & York, Baltimore, Md.

"Terman Group Test of Mental Ability"—World Book Co., Yonkers, Chicago.

"Trabue Completion Test Language Scales"—Publications Bureau, Teachers College, Columbia University, New York City.

"Thorndike and Gray's Reading Tests"—Publications Bureau, Teachers College, Columbia University.

"Courtis Standard Practice Tests in Arithmetic"—S. A. Courtis, 82 Eliot St., Detroit, Mich., or World Book Co., Yonkers, Chicago.

"Rugg and Clark's Chicago Algebra Test"—University of Chicago Bookstore, 5802 Ellis Ave., Chicago, Ill.

"Stanford Revision Binet-Simon Intelligence Test"—Houghton Mifflin Co., Boston, Mass.

"Navy Tests"—U. S. Navy, Washington, D. C.

Evening School Fills Need. The experience of the past season shows that the evening vocational high school at Denver, Colorado, has filled a need in the community that is met by no other form of educational activity. It has offered to those employed during the day, a second chance for neglected school opportunities and holds out the chance of self-improvement not otherwise available. The 1,500 students enrolled come from all walks of life and represent nearly every trade, industry and profession.